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ABSTRACT

Based on the author's international observations and experiences in education, the book attempts to convey to educational policy-makers, administrators, and teachers, as well as adult educators in developing countries, the significance of the current agricultural break-through and the need and potential of adult education to farmers. Today's agriculture is a challenge as much to the intellect as to physical effort; consequently, education is germane to its progress. Drawing on experiences, particularly in India, the author discusses desirable principles in the methodology of educating adult farmers: (1) problem identification, (2) co-relation, (3) participational demonstration, (4) up-to-dateness, (5) equality in communication, and (6) continuing self-study. Individual chapters are devoted to topics of functional literacy, mass media, trainers' programs, women farmers and young farmers, a world university for farmers, research and universities, and voluntary organizations. The author stresses the need for mass media and literacy to function together and the need for functional literacy programs to be linked with forward-looking economic activity programs. Moreover, agricultural development calls for systems analysis, an analysis of interrelationships affecting agricultural development in a specific area. The concluding chapter focuses on unique trends and stages of rural development in India. (EA)

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ADULT EDUCATION FOR FARMERS IN A DEVELOPING SOCIETY

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PREFACE

This book is an attempt to introduce educational policy-makers, administrators and teachers as well as adult educators, in developing countries, to the significance of the current agricultural break-through and to the need and potential of adult education to farmers, its techniques and agencies.

Adult education emerged as a responsibility of society in the course of the industrial development in the West. Workers' conditions, their poor wages, their reconciliation to their down-trodden lot and the connection of all this to their illiteracy and stagnant knowledge and attitudes aroused the liberal conscience of the intellectuals in U.K. and other countries in the West. Thus arose the workers' education movement. It involved several leading Universities and later on the States. When the Communist Revolution came in Eastern Europe, with industrial workers as the spearhead, adult education of workers became a principal plank of the programme of Communist Society. (Agricultural workers were attended to much later).

In the democratic West, with the growth of affluence and the concept of the Welfare State, primary and high school education transformed a whole generation in the twentieth century. Consequently, by the middle of the century, there was a shift from workers' education to continuing education for the professional people at various levels, aiming at the improvement of their skills and the widening of their mental horizon in a fast-moving technological society.

The story in developing and backward countries is one of fitful enthusiasm under the impact of Western liberalism. It shows little awareness of the link between economic development and education for adults. As colonies or dependencies of western powers, the intellectuals in these backward countries could at best think of

"enlightenment" as the primary obligation. An outstanding example of this attitude was the mass literacy movement in India round-about 1936. Economic development was not much of a concern of the educators.

Most of these countries are agricultural. For half of the 20th century, agriculture was more or less static in the countries. Education or no education, no significant economic growth in the agricultural sector was in sight. Little wonder then that few educators thought in terms of linking adult education to agriculture. Literacy and general information about better rural life—these were the objectives of what came to be known variously as fundamental education and social education.

The result is for every one to see. In hardly any of the former colonies or former imperial dependencies with large populations, has the mass literacy or social education movements made much of a dent during the last three decades. Even the idealism of the struggle for freedom could not sustain adult education movements. Occasionally, an enlightened dictator or monarch has tried to force the pace by pursuing short-term, intensive, country-wide programmes. But in most other developing and poor countries, the politicians' concern has been with primary education of which the growth has been noticeably fast. But since the productive age group (14 to 45 years) has remained more or less untouched by educational movements, (and since the average age has increased with better medical facilities), the overall picture continues to be dismal. And, of course, education has, by and large, failed in these countries to contribute significantly to economic development.

Recent agricultural break-through has emerged as an unprecedented challenge to adult education in particular, and to educational policy-makers, organisers and teachers in general. There are two choices before them. One is to treat the new growth in agriculture only as a technological process leaving it to scientists and agricultural experts to give guidance to farmers as best as they can, depending mainly upon the farmers' own motivation to sustain the dissemination of information and skills.

The other is to seize upon this situation as a wonderful opportunity for launching an adult education programme that will bridge the gulf between education and economic development, and that will spread the benefits of new agricultural technology to a wide circle, specially to small farmers and landless labourers.

In this book, I have been concerned with the second alternative. Having been in the adult education field for over 20 years, and having spent the last 7 years in agricultural administration and extension, I thought that it would be a great pity if adult education were to get left out of the current dynamic agricultural tempo. Were it merely a question of assigning a role to educators, national interests might not be affected. But the fact is that an agricultural revolution peters itself out or just tarries over a plateau if education is not a central ingredient. Already signs of such a situation are in sight in some countries. Before it is too late, educational policy-makers, organizers and instructors must understand the implications of the agricultural revolution and their role in it.

Not that I am unaware of the position of the extension workers and specialists and their contribution to the modernization of agriculture in backward societies. I venture to think that this book should be equally useful to them. There is hardly any literature for them in the background of conditions in developing societies. Of course, foreign and Indian scholars have done excellent micro-studies that have provided the basis for learned treatises some of which leave the extension worker wondering what exactly he should do or attempt.

I am convinced that both the adult educator and the agricultural and extension expert need to have some reorientation. This book may perhaps facilitate that and be the starting point of a process of mutual education and understanding.

Partly, this is because I have moved in both the 'worlds', and, therefore, know the points of access to their thinking.

Moreover, this book, unlike others on such subjects, is based on direct observation, experience of planning and organisation and discussions with officials, farmers and non-official workers. The theories and conclusions that well up here and there are the result not of extensive study of scholarly books and reports. They emerge from my observations and analysis. I take full responsibility for them. I would like to make it clear that Government of India are in no way responsible for them, though opportunities for local observations and studies and discussions came my way as an employee of Government of India.

I have considered it necessary to repeat in more than one chapter certain points because repetition fortifies the process of communication. Work-centred education, widening of the spectrum of the word "educator", the significance of the small group, these and some other points are to my mind so important for any worker in adult education for farmers that they could bear repetition.

I have deliberately avoided the scholarly manner in the presentation of ideas and facts. My purpose is to communicate to those who are or will be involved in the organisation of adult education for farmers in whatever capacity. If, as a result of these observations, some people could feel inclined to try out these ideas, in an experimental spirit, I would be quite happy.

As the book had to be printed in some haste, some printing and factual errors have crept in. An erratum has been provided at the end.

I am grateful to Dr. T.C. Roy of the Extension Directorate of the Department of Agriculture for allowing the use of some photographs and the map. I am also grateful to experts associated with Indo-Japanese and Indo-German Projects for their help. Mr. N. Perumal and Mr. J.S. Sharma have given me valuable advice.

New Delhi
Aug. 15, 1972

J.C. MATHUR

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Adult Education for Farmers in the Green Revolution

Though the term green revolution is popular, it is a little premature to use it for the transformation of agriculture that is currently taking place in India and some other developing countries. It is a revolution all right but its results which is what the world 'green' connotes have still to be sufficiently widespread and stable for this term to be used. In examining the question before us it will, therefore, be more appropriate to consider the extent to which adult education can contribute towards making the current transformation of agriculture a widespread experience and putting it on a firm and long-term footing. In other words, we should consider why adult education becomes a more significant factor in agricultural development at this stage than it was in the initial stages of the change.

The initial stage of the new agricultural transformation was primarily concerned with break-through in the genetic development of seeds, brought about by agricultural research scientists. The genetic improvement followed the adaptation and trials of certain exotic dwarf varieties of cereal seeds to Indian conditions. These have two principal characteristics, namely, they are high yielders (4 to 5 times the indigenous varieties) and they do not 'lodge' (thus preventing heavy losses of grains resulting from the drooping of plants). Research scientists have one other major achievement to their credit, relevant to the 'revolution'. Apart from high-yielding varieties, they have been able to develop short duration crops; both cereals and non-cereals. For example, as against the old 180 days maturity, there are now paddy crops of even 100 days maturity. Moong dal, which can mature in 3 to 4 months,

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even sugarcane of short duration maturity and a number of wheat varieties that ripen fast,—all these have completely changed the outlook for farmers. They can now attempt to obtain two or three or even four crops on the same land. From multiple cropping to relay cropping is the latest move and the potentiality of small plots of land is tremendously increasing as a result of such cropping patterns. It so happened that the evolution of high-yielding and short duration varieties occurred at a time when cereal prices were favourable to the farmer. The incentive of prices stimulated interest in the results of research leading to higher output.

That was the initial stage of the agricultural breakthrough. The second stage was a sharp awareness among farmers of the value of those aids to production which in the past were not so meaningful in the absence of such new varieties. These aids are additional resources of water (ground water through tubewells), chemical fertilisers and pesticides. All the three were known before. The revolution came in the attitude of the farmers towards these aids or inputs. This is because the new varieties can succeed only with heavy dosage of fertilisers ; heavy dosage of fertilisers calls for assured water supply and the lush growth resulting from the application of fertilisers and water call for plant protection measures. A contributory factor in the new awareness of the immense value of ground water and other inputs was the countrywide drought in the years 1965-66 and 1966-67. In a sense the drought was a blessing in disguise for it forced many farmers to turn to alternative sources of water and to new seeds and scientific practices for which research was already preparing the ground.

The third stage of modernisation follows from the two earlier stages and is equally significant. Investment on inputs became worthwhile for the farmer because of the heavy and assured return from the new crops. What is more, such investment became meaningful even for small holdings of say 3 to 5 acres each. Thus even a small farmer can look forward to a margin of profit from the investment that he makes in production. This led to a big increase in the demand of farmers' credit. Not only

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were the traditional credit agencies such as the cooperative societies roused into action, the commercial banks also began, howsoever haltingly, to operate in some rural areas, to assist the farmer in getting the inputs. The overall result of these operations is that the farmer has begun to think in terms of investment agriculture which is different from the traditional concept of subsistence agriculture. The uncertainties of the monsoon are still a dominant factor. But wherever water resources are available, regardless of the vagaries of the monsoon, the concept of investment agriculture is very much a practicable proposition.

It is necessary to understand these three stages that constitute the substance of the 'green' revolution in India. It is at this phase that the fourth stage of agricultural revolution, namely, the communication of the new technology as well as of the implications and practices of the new agricultural economy to the primary producer has to emerge as a sustaining and extending factor. Can research, inputs and credit by themselves sustain agricultural transformation over a long period in the five hundred thousand villages of India ? Can the practice of new technology be adopted, the access to the new inputs achieved and the utilisation of the new credit ensured for the 60 million holdings in this vast country without education of the producers ? Hitherto the general belief of scientists and programme planners has been that adult education including literacy are a desirable aid, but by no means essential elements in the new agricultural strategy. Much of the training has been treated as an auxiliary activity, not necessarily in the main stream of the production programme. But the problem is far more complex and it is necessary to analyse at this stage some of the complications that may arise if adult education does not step in at this stage of the 'green' revolution.

The first complication is caused by what some sociologists writing about India have called 'replacement of the jajmani system by the money economy.' By the jajmani system is meant the services in kind which the smaller tenant and the agricultural labour and craftsman used to provide to the bigger farmers. With the increased

potential of the small holding the rendering of such services is becoming redundant. The bigger farmer therefore may wish to mechanise fast. The small farmer will, therefore, have to be quick about learning the new technology and adopting new sources of income, such as multiple cropping and subsidiary activities *e g.* poultry, piggery, milk production, etc. If early action is not taken to carry the technology and to provide the credit facilities and information about these facilities to the large number of small farmers and agricultural labour, there will be a transitional phase of tension between agricultural labour and the medium size farmers. The extension of the programme through the medium of education and training is therefore going to be a critical factor in the coming years. It was different in countries like United States where farm holdings were large and information could be sought by the big farmers on their own initiative. In a country where 70% population depends upon agriculture, there cannot be a switch over to the large mechanisation farm. On the contrary large multitudes would continue to live on the land. They will seek equality of opportunity. The aim of education and literacy movement can be to provide equal opportunities to the rural people for participation in agricultural development. Such equal opportunities alone will sustain the production programme in the future.

There is another complication too. The mechanisation of agriculture is the first major step towards the widening gulf between urban and rural life. The agencies in this process are the personnel of government offices, local rural institutions, banks, shopkeepers, businessmen and non-Governmental organisations of various kinds. Most of them are men with some sort of education and certainly literacy, and yet this process of the pressure of a developing rural sector upon the urban sector is demonstrating the inadequacy of their education, their skills and their attitude. Never before was it more necessary to inculcate a general understanding of psychology and sociology among personnel who are to operate in the villages. Again, it is in such a situation that the use of the techniques of communication become relevant not only to the professional educators but to all those who

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have to operate among or with the villagers. Adult education thus becomes a critical factor in the bringing together of the village and the market places.

Another complication that needs to be reckoned with is that the farmer (or fisherman, or poultry man or cattle farmer, etc.,) in many developing countries has no institution of his own as a reference centre, as a source of information, as a forum for exchange of information and experience. Not only is there no farmers' labby in India there is also no farmers' institution at the grass-root level. Consequently, it is the politician and the administrator who become his spokesmen subject to their own convenience and requirement. But the revolution in agriculture cannot be sustained over a long period in the absence of an institutional framework that does not depend upon the fickleness of political expediency or the remoteness of the administrative mechanism. How is such an institutional framework to develop ? One would have expected in India the Community Development structure to serve this purpose ; but in its very nature the Community Development structure is a multipurpose organisation concerned with many things and liable to be dominated by the political rural leadership. In any case, though it has provided a good framework for local rural self-government, the Community Development set-up cannot be depended upon for professional level and intensive agricultural organisations. How then is such an institutional framework of farmers to arise ? One answer may well be 'through Adult Education.'

Scientific research in agriculture is moving fast and practically every month new practices, new seeds, new machinery and new perils to crops are coming to light. In such a situation communication and training (for which a composite term is Adult Education) will increasingly become a basic necessity for farmers For these subjects they will need to have a baseline of their own, a continuing institution of their own This may be a club or any other kind of institution so that in an atmosphere of equality, freedom of expression and exchange of opinions, they can engage themselves in a process of self-study. If such small circles or groups

emerge they will be a continuing factor in the process of transformation. Eventually, they might well become the professional level Organisational Units of the primary producer. These professional level Primary Units can, in the course of time, coalesce into federations for various regions. This is just the time to make a beginning of such a process. If it is not done the Green Revolution may drift into aimlessness and be tossed about by rumour, conflict of interests and want of moorings.

The above analysis of the role of Adult Education in (*a*) stabilising the agricultural break-through and (*b*) in carrying its influence and operations extensively over large areas and multitudes, would be an academic exercise unless those who have been concerned with general Adult Education undertake practical programmes of implementation which can convince scientists and programme planners. This brings us to the objectives of planners of adult education in supporting improved farming.

Adult Education for large groups of farm producers has to consist mainly of an instructional programme which has to be (*a*) composite and, (*b*) production-oriented. By production-oriented is meant not just the giving of instruction on matters which concern particular kind of production but the provision of on the job training without taking away the learner from his work so that he can simultaneously use the new skills in the various stages of his production operation. This Adult Education has to be composite in the sense that it has to combine demonstrations on farmers' fields with other devices such as training camps, talks, audio-visual methods, etc. Moreover, it is to be linked with the supply of the inputs such as fertilisers, machinery, pesticides so that the farmers who buy them learn their proper use. The exercise of preparing the plan of one's own crop or other production operations should also be part of this education. Another skill which has to be imparted is that of dealing with personnel who are to supply inputs and those who are in Government responsible for extension and administration. Under the impact of the new technology agriculture is no longer to remain a simple affair based on common sense and traditional wisdom. Therefore a composite training

programme for farmers has to embrace such diverse and modern skills as the skill of keeping accounts, writing applications and above all an insight into the price mechanism and the market behaviour. For the young and the more energetic element among the primary producers, there may have to be more specialised training in processing and mechanical operations, storage, etc. The setting up of Groups of Farmers around demonstrations and discussions is of course an essential element in the training programme.

Adult Education for farmers, fishermen, etc., cannot be planned on territorial basis. It has to be organised for specific production programmes, and mainly for localities and areas where such specific programmes are undertaken. People concerned with general adult education programmes are used to organising adult education in terms of districts and sub-divisions or in terms of schools and institutions. What is here suggested is that they should examine economic development schemes of the various regions and identify those schemes in which training and adult education can and should be a critical factor. The Indian Plan has schemes like Intensive Agricultural Development Programmes, Small Farmers' Schemes, Intensive Cattle Development Programmes, Dryland Farming, Intensive Poultry Development Programmes, Command Area Development of Irrigated Regions, special projects for groundnut, oil seeds etc., service centres for Agricultural Machinery, Inland Fishery Development, etc. These specific schemes are dotted all over the country in different areas. The adult educator has to identify schemes in which he may be interested and locate the points at which adult education would be introduced.

Functional Literacy for the primary producer is a highly complex and sensitive instrument. Old notions about primers and the six-month duration training in literacy have to be discarded The adult educator should consider the preparation of vocabulary for specific production programmes and treating that vocabulary as the vehicle as well as the bait for literacy teaching. It can be meaningful only if the learner can apply simultaneously what he is learning. Of course, bigger horizons of

literacy will open out once the learner has got acquainted with that part of it which is of immediate utility to him. But the first thing is immediate utility.

The role of adult education is as significant for personnel concerned with production programme as for the primary producers. Personnel training has hitherto been organised in a rather fitful manner by governments both central and the states. Their schemes have been largely for government officials. Beginnings have recently been made of training programmes for personnel concerned with agriculture in business, industry and in banking. But neither universities and colleges nor non-governmental adult education institutions have entered this field except in a marginal way. Perhaps, this is because people with knowledge and experience of agriculture have not been initiated into the philosophy of adult education and are not yet admitted into the inner circle of the adult educators. It is also a fact that people in government, business and industry occupying high positions have, in India at least, to be persuaded to accept the importance of adult education for their personnel. It need hardly be pointed out that learning today is a life-long process for people in all vocations. In the field of agriculture most professions tend to get out of date and in order to keep pace with the latest discoveries they need to be exposed repeatedly to training and educational programmes. Moreover, the personnel concerned with programmes of distribution of seeds, provision of credit, demonstration of fertilisers, arrangement of marketing have to acquire the skills of planning programmes, implementing them and coordinating with other agencies. These in themselves are highly specialised skills today. In India implementation of many a well planned production programme runs into difficulties for want of attention to details of coordination and synchronised action. Adult Education for personnel has to emphasise these skills.

The agencies for adult education both for farmers and for those otherwise connected with agricultural development may have to be multifarious and both governmental and non-governmental. Hitherto, most of the work in this field has been done by governments. It has to be

This Bihar Farmer could grow wheat for the first time, thanks to the new
and the new practices he learnt.

My own tube well and pump—Vaisali

Ravine-reclamation through terracing—Mandi

examined what contribution non-governmental agencies can make to adult education for the green revolution and in particular in what way a connection can be established between general adult education and that specifically for the new agriculture. In other words, the position of the various non governmental organisations engaged in general adult education activities has to be determined in the framework of agricultural development. One approach could be to assign to such non-governmental adult education organisations specific work of functional literacy and of the training of personnel in the skills of communication and audio-visual techniques. These institutions have experience of this kind of activities and could, therefore, make their contributions in a field in which they have the capability. Under such an arrangement, however, it will be necessary to have proper coordination between the non-governmental organisations and the governmental agencies responsible for production and extension and supplies to farmers. This is because the tranining is to be provided at various stages of farm operations and supply of inputs. Practical difficulties have been experienced in achieving such coordination in the experiments conducted so far. The other approach could be that the non-governmental organisations should themselves organise production-cum-training programmes. In so doing they will have, in the area chosen by them, to apply themselves not only to the skills for which they have the capability (*e.g.* literacy, communications, etc.) but also to various aspects of production. They may not be able to operate over a large area but whatever little they do, it will be a more self-contained undertaking and within their limited sphere they would be able to gain a first hand insight into aspects of a production programme and thus bring about that synthesis between production and transmission of information attitudes and skills which will make it a complete adult education experience.

Another aspect of adult education and the green revolution is the education of the urban people and the intelligentsia in agricultural matters. Life in big cities as well as small towns depends very much upon the tempo and extent of agricultural development in the rural areas.

Yet not much has been done for the understanding of the problems of agriculture. Fantastic notions about poverty, backwardness and conservatism of the farmers still prevail among many town people. Vague ideas about the position of the small farmer and landless labourers based upon out-of-date information are also not uncommon. Documentary films on agricultural development shown in the cinema houses are not specific enough. Lately, some newspapers have introduced columns on farmers and rural communities. However, by and large, the various media of information are dominated by urban and political issues. In the courses taught in schools and colleges there is very little attempt except in specialised institutions, to acquaint the future citizen with the problems of agriculture, fisheries, poultry, cattle development, etc. This is a big gap in our educational system. In the circumstances, it will appear to be one of the tasks of adult education to provide to the towns people opportunity for improving their knowledge of these issues, to discuss the problems and to express views. This will make for harmony in national life and would also contribute towards bridging the gulf between the city and the village. In this process, non-governmental institutions concerned with adult education have a very significant role to perform.

For the first time in India and other developing countries agriculture is becoming as specific, as goal-oriented and as investment-based as industry is. Undoubtedly, this attitude is the harbinger of a revolution. Those who are concerned with education would be judged by history in the light of their own initiative at this juncture in carrying forward the potential of the coming change to its logical fruition. The old concept of intellectual enlightenment being different from production enterprise based upon physical work has to be discarded. Today's agriculture is a challenge as much to the intellect as to physical effort. Therefore, education is germane to its progress.

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Implications of the New Approach

Farmers' Training and Education is distinct from motivational communication with farmers. Much of the extension work during the fifties was of the latter category. To some extent that was its weakness. Motivation may be generated but cannot be sustained by communications and exhortations whether audio-visual or direct. In the case of farmers and other primary producers the most effective motivation is the economic motivation, the opportunity for a distinct increase in income resulting from investment in improved practices. The two basic factors of increased income are higher yields and better prices. When these two factors appeared on the Indian scene together then motivation became relatively simpler task.

The High-yielding Varieties Programme (for that matter any programme based upon techniques and inputs that would distinctly and substantially increase yields and, therefore, income) has given a more specific objective and clearer defintion to farmers' training and education. The yields in the case of wheat which used to be with the best indigenous varieties about 10 to 15 maunds per acre, has with the new seeds but with the same improved practices (*i.e.* water, fertiliser, plant protection) that were being recommended in the past, been raised to fifty maunds per acre. The prospects of this sharp increase in yield and income were a sufficient motivation for seeking the skills required for using the new seeds and participating in the new programme. Therefore, the task of farmers' training and education is to provide these skills. The skills are being refined by research scientists from year to year, sometimes from month to month. This fast pace of technology, therefore, not only makes training of

the producer imperative, but also requires constant alertness and awareness of new methods on the part of those responsible for training. Training thus is a direct response to the production process implied in a programme; in fact, it has to be a part and parcel of this process. In the first two years of high-yielding varieties programme, the profits from the multiplication of new seeds were so attractive that a number of resourceful suburban farmers eagerly sought information and skills from all kinds of sources and at any cost. But after the first stage was over, the real problem of adoption of these practices by the small farmers came to the fore. The small farmer is not wanting in motivation so far as programmes like HVP are concerned. But he has no access to new techniques and inputs. This is where production based farmers' training becomes a national necessity.

The task of Farmers' Training, therefore, is to provide instructions to the primary producers in a specific field as part of the production process. This has certain implications: (a) The training process has to correspond to the various stages of the production operations. In the case of crops, for example, the training will have to have a timetable following each stage beginning from the preparation of land to the harvesting and even marketing. This kind of detailed break-up of the 'syllabus' has to synchronise with the phases of the production process *e.g.* irrigation, top dressing, plant protection, foliar spraying, etc. (b) Since the training has to be for the actual participants in a specific programme, the 'class room' of the training has to be the place of production, *e.g.*, the farmers' fields in the case of crops. Instructions by word of mouth or printed word or through modern aids should follow demonstration on farmers' fields rather than precede them. It is also obvious that such a 'class room' has the additional advantage of not compelling the actual worker to be away from his place of action for long durations as becomes inevitable in the case of most campus training. The demonstration should be on farms of private farmers within easy reach of the farmers participating in the training programme. (c) The training should have a bearing upon the use and availability of

inputs required for the new technology of the specific programme. This link with inputs (*e.g.* chemical fertilizers, machinery, plant protection material, irrigation, credit, etc.,) has to be such as to convince the farmer that the instructor is not merely a theoretical teacher ; he can give him practical tips for getting access to his actual needs. The educator thus gets somewhat involved, though not directly in the supply and arrangements of inputs for crops, etc. At any rate, he has to have a more up-to-date knowledge of what is happening. It means also that supply and arrangements of inputs for crops, etc., could, where possible, provide the occasion for the communication of information and techniques. Conversely, those responsible for the supply of inputs have to be drawn into the orbit of the educational process.

The use of the demonstration as the 'class room' requires a little more explanation. Demonstrations in government seed farms and in research laboratories have been an old feature. They did not carry conviction. Demonstrations on the farmers' fields by extension officers were an improvement. But the kind of demonstrations that are known to make the utmost impact are those conducted on the private farmers' fields by scientists preferably from research institutions and universities. Of course, all such demonstrations imply a joint effort of scientists and extension officers. But the important thing is that not only will the scientist be expected to be up-to-date, he would be in a better position to answer questions and to allay doubts where necessary and further to identify field problems and, perhaps, to obtain, as a result of his direct contact with the laboratories, a quicker answer to those problems than is possible through the usual course. Joint demonstrations by scientists and extension officers are thus a practical example of the getting together of research, extension and production.

The farms on which demonstrations are organised by scientists with the help of extension officers have also to be the places where training camps or Field Days of the neighbouring farmers would be arranged for a day or two. This is what would make them 'class rooms'. A mere demonstration may restrict its impact only to the beneficiary

farmer and a few others, but the organisation of training camp at the site of demonstration provides an opportunity for communication with a larger number of farmers of the neighbourhood.

The new approach to farmers' training implies also a specific use of audio-visual media rather than diffuse and general use of these media. This has also some implications: (*i*) The usual radio and film programmes meant for rural audience sought to reach the rural community as a collective organism and to refer to all its basic needs in a 'basket' as it were, including health, production, cultural activities, crops, weather, family planning, traditional customs, etc. The new farmers' training programme has to make a more selective use of the media. The media programmes have to be fewer but should be instructional and problem-oriented. They may lack the sophistication and popular appeal of the general rural programmes. But they would certainly use more effective pedagogic techniques in order to facilitate assimilation of the instruction and guidance in new technology. (*ii*) Mass media programmes have to be local rather than national. One of the limitations of films or centrally produced posters, brochures, films strips, etc., is that they overlook the local conditions, crops and their problems. It follows, therefore, that the mass media and the audio-visual items will have to be adapted to the local needs. (*iii*) Different media like film, radio, posters and the printed word have to be inter-related and their production has to synchronise with the various stages of the specific operations of the farmers. This has hardly ever been attempted in the past. But the optimum effect of the media can only be obtained if they reinforce each other rather than confuse the farmer by providing different kinds of diversions.

Farmers' education (like any other form of adult education) has to be a continuing process. In other words, it must be self-sustaining and it should not be terminal, since every year—sometimes every month, new techniques and varieties, etc., offer new opportunities and necessity for learning. If the learning process is not terminal but continuing, even the use of the common expression 'follow-up programme' would be a misnomer. The aim is

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not so much follow-up as continuance of the opportunity for self learning by farmers. What institutions can provide opportunity for such self-study ? The Panchayats cannot obviously fill the bill because they are multi-purpose administrative organisations based upon political consensus (or otherwise) rather than on common professional interests. It is also obvious that a self-study organisation cannot be too large. It cannot be diffuse. All this points to the necessity of having small self-study groups of farmers or those who participate in specific production programme, something of a cross between a club and a guild. For example, farmers who participate in the training camps or crop demonstrations, would need to be organised into small groups of ten to twenty members each, compact, homogeneous, earnest, in order to enable them to continue the process of learning in between two training camps. They will need to be given material and facilities for learning and of mutual discussions and observations. Radio sets, brochures, posters, material for being read aloud and such new audio-visual devices as phono-viewers would enable these small groups to continue their pursuit of getting latest information and exchanging experience. Such groups would provide a point for two-way communication between the farmer and the expert, a point which will be even more local and effective than the Village-Level Workers. (Of course, the Village-Level Worker will be the primary agency for the formation of the groups.)

It is the absence of this two-way communication which had been at the root of the failure of many extension programmes in the past. An organisation will have to be maintained for attending to letters and calls from members of the clubs so that their questions and doubts can be answered promptly and satisfactorily, either through radio programmes or through letters. A small group of this kind would also lend itself well for being a self-service group. A group of beneficiaries could be formed, for example around a common tubewell. They could take on hire the harvester for common service ; they could have a common ownership of essential improved implements. From this kind of service group the

transition to an 'Interest Group' for voicing their genuine grievances and for contacting authorities could often follow. The growth of such interest groups is important for the health of our democracy.

In the past, it was often assumed that the responsibility for transmitting information is exclusively that of the extension staff and of the information units. But a specific production-oriented programme involving so many diverse factors, distributes the responsibility for the communication of information and instruction to a variety of personnel. One can immediately think of the following categories of personnel as "educators": research scientists, production staff, suppliers of inputs (both manufacturers and distributors), specialists from other field such as minor irrigation, agricultural machinery, social conservation, etc., bank officers engaged on loan programmes among farmers, staff specifically employed for farmers' training in selected districts and the normal extension staff. It is true that it is the specific staff for farmers' training who will have to play a crucial coordinating role. But they have to look upon themselves not as exclusive communicators, but primarily as a cadre offering its services to the other categories of personnel mentioned above. They should be on the look out for the various kinds of programmes of production or provision of infra-structure and inputs and contact the people responsible for such programmes with the offer to arrange instruction, communication and media facilities etc.

Since the use of modern technology as in HVP involves diverse functions and processes, and since the definition of the 'educator' has been widened as explained above, farmers' training and education calls for a kind of coordinated effort by diverse agencies and authorities which had never been attempted before at the field level. The agencies in India are similar to the 'educators' listed above *viz.* (*i*) universities, research centres and other training and educational institutions, (*ii*) production wings of the Agriculture Departments as well as officers concerned with laying out programmes such as High-yielding varieties programmes in the districts and blocks, (*iii*) extension and training directorates and officers at the

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State level as well as the district and blocks, (*iv*) information units of the State Government Agriculture Departments and of the Extension Directorate, (*v*) information media of the Ministry of Information and Broadcasting of the Government of India *e.g.* All India Radio, Films Division, Field Publicity organisation, etc., (*vi*) village-level workers, (*vii*) local panchayati institutions, (*viii*) credit and financing sections and officers of the State Government, cooperative organisations and commercial banks, (*ix*) those units of Government as well as public and private sectors that are responsible for the supply of inputs such as fertilizers, plant protection, irrigation, etc.

This kind of coordination for farmers' training is not easy to organise. But it is a must if the objective is to converge all efforts upon the farmer. Coordination has to be attempted through some well-known devices such as coordination committees or action groups or task forces which should be different from the large bodies of the unwilling and uninvolved as many coordination committees are. People who are actually responsible for various aspects of the programme should be members and they should be there not as advisers but be answerable for different elements of the programme. At every level, there may have to be a coordinator. He may not necessarily be the decision maker. There is a distinction between a coordinator and a decision maker, for decisions may have to be taken by people responsible for various specialised aspects of a programme but since these aspects impinge upon each other, there has to be somebody who has to be alert about these points of contacts and to arrange co-relation. In any attempt at coordination, it is important that each agency should accept the responsibility to inform the others concerned of the steps taken by it. For example, in the selection of the demonstration farms by the research scientists, there has to be a prior consultation with the production wing and the training staff. Preparation of charts and reading material by information units has to be done in consultation with researchers and local production staff. The dates of training camps have to be arranged by extension officers in consultation with research staff and media agencies. Radio programmes

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have to be worked out by the radio authorities in consultation with the production wing, the researchers and the training staff. It is obvious that unless there is coordination in these details, a well intentioned training and educational programme would run into difficulties.

The new approach to farmers' education is intensive. This means that the farmer has to be approached as an individual producer. For an individual producer some sort of a farm plan becomes a necessity and a farm plan ultimately has to be a part of the training process. Previous attempts at farm planning failed because they were not part of a training process nor of any specific production process. They tried to become all-embracing and comprehensive plans. In the farmers' training programme, a modest beginning will have to be made. Perhaps, with some sort of input Cards or Pass Books having punch-hole sheets for different crop seasons mentioning the requirements of the various inputs and indicating the steps to be taken by the individual farmer. The basic data could be on the hardboard cover. This Input Book or the Farm Plan Book of the farmer will be at once a valuable record of the farmer's own needs and a personal medium of education. As experience is gained and as the farm develops, this very pass book could become the nucleus of a bigger plan of the farmer. Every trainee could be the recipient of information sheets issued by the training unit or the researchers in the standard size form. These could also be added to the farmers' book.

Lest it be misunderstood that a farmers' education programme will only be confined to demonstrations, training camps and Farmers' Discussion Groups, it has to be emphasised that it cannot function without an institutional base and a base-line campus. The campus can be either at the University department or at the Village Level Workers Training Centre or some other suitable place. This campus will not only be the base line for the other aspects of the training, it will also organise short duration specialised courses. One of the features of the new technology even of HVP and multiple cropping is that certain items of work which the farmer was not bothering about in the past, have become of lively interest to him.

Examples are, drainage, soil conservation, new techniques of fertiliser application, tractor driving, use of power sprayers, etc., etc. Not all farmers may be interested in them, but some may, while a few may even wish to make of it a side-profession to provide to others specialised services of this kind. For all these selected farmers special short courses will need to be organised at the campus, the duration varying according to the necessity of the farmers and of the training itself.

The place of farm women in farmers' training programme has in the past been seldom appreciated in practical terms. Most training programmes for women were in various aspects of Home Sciences and inevitably tended to be rather urban oriented. They will continue to be useful particularly in view of the need for emphasis upon the nutrition aspects of the new varieties of cereals and of the ancillary foods. But it is the training of women in the appropriate functions of actual farm operations (and for that matter of operations in cattle rearing, milk production, poultry breeding, etc.,) that has yet to receive attention. The new concept and programme of farmers' training will have to involve the women in the training programme after identifying the tasks which they usually perform in the different parts of the country. In some areas women labourers are distinct from the owner farmers and since the training is generally confind to owner farmers, labourers are left out. Special attempts have to be made to involve labourers both men and women but in particular women. Farmers' wives, of course, have to be involved even when they are themselves not performing the tasks. This is because in decision making and in farm planning, farmers' wives play an important role.

Farmers' education programme in the past did not involve any specific action on providing literacy to the illiterate farmers. The general belief is that a farmer can learn by seeing and hearing and that illiteracy is not such a handicap. While this may be generally true, there are two aspects that also deserve consideration. First, as technology becomes complex, not only understanding but also retention of the new technology becomes crucial.

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Farmers are known to have excellent memory. But there are limits to it. The resourceful educated farmer will always have an advantage over the illiterate small farmer. Literacy, therefore, becomes an important factor for giving equal opportunities to farmers adopting new technology. Secondly, experience has shown that the ignorance of tenancy laws is one of the big handicaps for the small farmer and agricultural labour. There are other laws also like the Minimum Wages Act that are seldom known. It is true that quite a few of the terms of the revenue laws are generally understood in villages. But if most farmers could have access to the text and interpretations of the text, things would no doubt be much easier for them. In the light of these circumstances, the new programme of farmers' training and education is to include what is known as 'functional literacy'. Functional literacy is different from ordinary literacy in two ways. First, instead of using the usual primers, it seeks to acquaint the learner with words that he has actually to use in his farming operations, in the accounts book, in the applications for credit, in the use of inputs, etc., as well as with regard to his legal matters concerning revenue laws etc. In fact, some of those very documents could be used as primers or at least a selective vocabulary should be made out of them. Secondly, unlike a normal literacy programme the learner in this case has to start using the skills of reading and writing while he is still learning them from day to day. He should not have to wait until the end of six months to be able to read the names of the fertilizers or seeds, etc.

These then are the major elements in the new concept of farmers' education and training. These are by no means rigid and they were not laid down initially ; they have evolved as experience has been gained in the implementation of a special programme of farmers' training in India of which an account appears in the last chapter.

3

Methodology or Androgogics of Farmers' Training

Everybody recognises that training adults is not the same thing as training the young people. Still, in India as well as other developing countries the teaching techniques employed in training adults, whether farmers or workers or women, are hardly different from those adopted for children. It is true that in the teaching of literacy during the last four decades various methods have been evolved and some tried with success. But they are not generally based upon adult psychology. When it comes to training that involves the communication of subject matter and information then the usual approach is the curriculum. The curriculum is divided into parts arranged in an order ranging from theory to practice. Generally, it is believed that first the basic theory should be conveyed and on that foundation the practices or skills that are to be taught could automatically follow. While recognising that the aim of adult education is to form attitudes, to give information and to teach skills, these objectives are generally approached in no way different from those for young people. Perhaps the only difference is that in the case of young people sometimes the emphasis on the play-way is also noticed.

But the time has come to emphasise that pedagogics for adults particularly in the developing countries (where the environment of learning is not charged as much with the automatic learning process as in advanced societies) have to be specialised. What is the justification for this kind of pedagogics ? In the first place, adults are men (and women) doing some jobs. An adult is not worth his salt if he is not engrossed in his main job, his professional ambitions, his desire to do good. He is not preparing

himself for a job but functioning in a job where he wishes to improve his performance. The concept therefore of preparatory education is quite irrelevant. Moreover, with the brain cells having been set already in the case of an adult, the scope for learning by rote and for the exercise of the faculty of memory is inevitably limited. An adult should not be expected to learn things as a child does, willingly or unwillingly. The adult faculty for assimilation and his urge for curiosity are aroused in the face of practical problems whether of his family or his society or his place of work. In such a situation his personality gets mobilised. Consequently his faculties are enlivened and even the unutilised cells in the brain are activised. Finally, an adult finds the class room atmosphere irksome. It is not merely a question of discipline. It is a question of subjecting oneself to forced childhood as it were. Sitting in a class room and being instructed as if he were on the threshold of life by learning about things, is an experience that no adult relishes.

There are several other sociological and psychological grounds on which the science of pedagogics for adult learning is being built up in several advanced countries in the world. In fact, a new term is now gaining currency called "Androgogics". Dr. Adams, a Venezuelian adult educator, has written a book in Spanish on Androgogy in which he has tried to differentiate and underline the priorities as well as the approaches that are necessary for adult teaching. In the West, particularly in U.K., there has been long experience of workers' education. But pedagogics were not considered important because in that phase of the industrial development of U.K., any method seemed to be adequate for workers who were getting more opportunities for promotion. It is later in U.S.A. and perhaps to some extent in USSR, that adult pedagogics or Androgogics have received attention. In U.S.A. the subject has emerged from the experience of what is known as continuing education which involved business executives and other middle level or highly placed individuals for whom special types of training programmes have to be organised. In that process it was realised that the teaching methods and instructional approach have

to be different and specialised. In USSR, I think, the experience gained in the thirties in organising the literacy movement in Central Asian republics was relevant in determining the criteria for the selection of methods to teach adults. However, in developing countries like India the entire adult education movement in the past was so much inspired by the ideology of the thirties for bringing about dramatic results by galvanising the people that such things as methodology appeared insignificant. We have, however, paid a heavy price for it. Adult Education has hardly made an impact even though the efforts go back to the first Congress Governments in 1936-37. Now, the time has come to consider the special elements of adult pedagogics. In so doing, however, the temptation to prescribe uniform principles for all kinds of adult learners will have to be resisted. Indeed the very idea of organising mass adult education on a uniform pattern for the whole country or for the entire state or a district is misconceived. Adults function in groups based upon professions or neighbourhoods or like interests. Therefore, both the organisation as well as the methodology of teaching will have to revolve around this kind of groups.

I am here concerned with farmers' training, that is to say, the training necessary for the adult farmer to enable him to become investment-oriented and a highly productive unit in a society like India which is so predominantly rural and agricultural. Motivations among Indian farmers initially resulted from the introduction of a new technology that could make dramatic difference in the production potential and actual production of farmers. By new technology I mean not merely the new seeds which are of course the outstanding feature in the current break through, but also include ground water exploitation, water management, multiple-cropping, crossbreeding of cattle, the new lines of improved poultry, new methods of storage, etc. It covers the whole range of agricultural technology embracing the use of new skills, new machinery and new inputs. Another motivation today has come from the desire to have good prices. This course followed from the conscious policy of Government to give remunerative and more than remunerative prices to farmers

during a critical period of Indian agricultural development. From the farmers' side it also means the desire to know the 'ropes' of getting the new prices ; how to avoid the clutches of middlemen, how to get at the market, what kind of transport to use, how to hold back the stocks and so on. A further motivation is to get at the investment sources. This includes of course credit and credit not merely from cooperative societies but also from banking institutions. There is a variety of resources for farming and there is also now a variety of sources for those resources. The farmer in several parts of the country is keyed up to seek information and to learn the ways of using these resources and of manipulating them and somehow or other getting at them. Investment resource of course cover inputs such as good seeds, fertilizers, etc.

It is in this backgound of the new motivation, that the definition of the teacher or instructor or educator has to be completely revised in the context of farmers' training and education. The farmers' educator is not just an instructor who holds classes. He is also not the school master who on a part time basis agrees to take farmers' classes in the evening. Educators for the farmer are now drawn from many ranks. For example, the research scientist who hitherto was satisfied within the walls of his laboratory is gradually becoming the farmers' guide and instructor. Therefore he has to learn and know about Androgogics. Agricultural engineers who were only demonstrating and selling or fabricating agricultural machinery have now to become teachers themselves for enabling the farmers to use and maintain the machinery. Agents of various credit institutions are no longer concerned only with complying with instructions from above for giving credit to viable debtors. The concept of supervised credit had come long time ago but it is becoming, a reality now. Supervised credit implies that the functionaries who are responsible for giving credit have to know and to watch the uses to which the credit is put. Therefore, they have to learn sometimes to guide him and to answer his questions, even to initiate him into the use of more paying practices that would enable him to return the loans and to take more loans and to open his own deposit accounts.

Likewise secretaries of marketing committees are no longer to be concerned only with organising orderly auctions. They have to see to the interests of farmers and if they are to do so effectively, they must be in a position to impart to them some of the methods of holding back the stocks, storing them and watching price trends and knowing, in other words, their interests in the tricky grain markets. Those who have to sell seeds, fertilizers, etc., have not only to publicise their commodity but also to teach beneficiaries how to use them. Personnel of these categories are therefore as much instructors as the extension agents or extension officers whose responsibility hitherto has been to communicate what is supplied to them by others. All this has to change and therefore the methodology of training adult farmers is a matter of concern to the vast spectrum of personnel in different positions who are all becoming members of a new fraternity of educators.

In the light of the experience gained so far, particularly in India, the principles explained below would seem to be desirable in the methodology of educating adult farmers.

The first principle is that of *Problem Identification.* The principle of problem identification involves the problems that arise from the application of new technology by farmers, cattle breeders, poultry raisers or any kind of persons engaged in farm occupations. It arises also from the particular conditions in a local area. These may be topographical, soil conditions, climatic conditions or economic conditions, etc. The problems could also be due to economic and governmental regulations which sometimes come upon the farmer like an avalanche. The identification of problems of these kinds and others should be the first step before an educator or instructor or a media man thinks of approaching a group of farmers to communicate with him. There is no point in trying to teach a farmer without first knowing his problems. The principle of problem identification applies both to those who have orally to instruct farmers or to address them but also those who have to communicate with them through other media of audio-visual kind, mechanical, electronic, posters, etc. In

this context a uniform curriculum for a large area would not hold good. For every area and group of people a new list of problems has to be drawn up which could be the basis of the local curriculum.

The second principle is the *Principle of Co-relation.* This is not a new word. Several decades ago, Mahatma Gandhi, who in his own right was one of the greatest teachers of the world in a professional sense, had popularised the use of co-relation in the context of basic education for children. I have always felt that that principle is far more relevant for adults than for children. Children learn more while they play, because for them the exercise of limbs and the exercise of their mental faculty are part of the same process of self-expression. This self-expression is best achieved through any kind of play whether it is games or dramatics or art. Therefore, what Mahatma Gandhi meant by co-relation, that is to say, relationship between learning and doing or picking knowledge through doing, (which, in turn, leads to co-relation between earning and learning) is something which should now be thought of afresh. For adult farmers this principle is indeed germane to the starting of the learning process. A farmer would not be interested unless the learning is more or less directly related to the doing and earning process. But this is not the only implication of co-relation for farmers' training. Co-relation here also means to establish links between various operations of the farming process. These operations are like different limbs. A doctor who tries to treat different limbs without pre-judging the relationship of these with the other organs of the body is sure to run into trouble. Therefore, the principles of co-relation would imply that the man responsible for water management should be well aware of the requirements of fertilizers; the person responsible for promoting pesticides of a particular kind has to be conscious of its impact upon genetics and so on. Another implication of co-relation is that a farmer is concerned with several agencies. Some are that supply credit, some that give inputs, some that provide guidance, adaptive research and so on and the principle of co-relation implies that before approaching the learner these different kinds of agencies and their role in specific farm

operations should be identified and in the communication of information and skills the material provided and the emphasis given by these agencies should be borne in mind.

There have been occasions when from one point of communication the exchange agent or instructor has had to pass on to a multiplicity of situations and elements. For example, in Himachal Pradesh when the Project authorities of Mandi district first thought of establishing milk collection centres in certain high altitude villages, little did they realise what they were going in for. They arranged to make payment on the spot to those who gave the milk. This created the motivation for producing more milk. The farmer began to look for fodder. The fodder was available but hitherto the farmer was not interested in the development of pastures over which he had rights from the Forest Department but which he did not exercise partly because he had no incentive and partly because the Forest Department would often lease the grass over these pastures to contractors. But the whole situation changed because now he wanted to give better fodder to his cattle. Meanwhile the Project authorities started introducing cross-bred animals which meant even greater emphasis upon fodder, both green and otherwise. That led to a new relationship with the Forest Department and a new interest in the growth of fodder crops on the common land. This led further to the side advantage of soil conservation. What an ideal opportunity for the educator to pass on from one thing to another! This is an example of co-relation. Water uses and agricultural machinery, storage and marketing and several other things could be cited as situations providing opportunity for the application of the principle of co-relation.

Next we come to the *Principle of Participational Demonstration*. Participational demonstration is different from the kind of laboratory demonstrations to which scientists and educators have been long used and to which plentiful references are made in text books on education. Participational Demonstration implies demonstration at the place of work of the learner. It implies also demonstration of a kind in which the

learner would actually be trying out the operations upon which the demonstrator (he may be a scientist or an extension agent or a supplier of input) places emphasis. Again Participational Demonstration cannot be successful if the level of the demonstrator is, from the professional angle, poor. That is one reason why in the fifties the the V.L.Ws were not effective demonstrators. It is only when scientists from institutions like IARI and Agricultural Universities went out into farmers' fields and guided demonstrations that the Participational Demonstration concept became a reality. The same thing happened when in IADP as well as Indo-German and Indo-Japanese Projects, scientists of high level came forward to involve the farmer on his own land. Participational Demonstration is perhaps one of the essential components of adult pedagogics. This kind of participation is different from that by the young learners. Correction here is to be of the minimum. Correction comes out of discoveries of mistakes by adult learners. That is why in Participational Demonstration do's and don'ts are not the right approach. It is the doing by the demonstrator, the avoidance of mistakes by the demonstrator, sometimes in a stage-managed manner, which would carry conviction with the farmers.

The fourth principle, for want of a more precise expression, I would call the *Principle of Uptodateness.* This implies fast communication between research and training. Many new names have been used for this. Sometimes it is called adaptive research, sometimes field problems unit. But the basic thing is that the instructor, whoever he be, has to be up-to-date. In the case of young learners it is possible sometimes to do without being up-to-date because certain basic aspects of life are to be understood by youngsters, aspects which never grow stale and which are the foundation of human personality. But here we are considering people whose personality has already been formed. Therefore, if the instructor wants to carry conviction with the learner he must himself be up-to-date. He should be reading latest journals. He should be having discussions with scientists, he should be carefully scanning newspaper columns for the latest

reports. He should verify the practices by writing directly to authorities. Above all he should keep his own collection of circulars of Government departments containing new instructions for farmers. How few instructors including extension agents do so ? They are sometimes ignorant even of the circulars given by the Directors of Agriculture or have to ransack their papers in order to find one. There are many extension workers in India who are indifferent to farm journals both foreign and Indian. They do not have time for them, or they don't find time. But communication by such people would be ineffective because the farmer is looking for and getting at new information through the radio and through films. They are living in the environment of new media in which communication is rapid. Word travels fast. Gossip is not merely the gossip of scandals. Gossip is of novelty and therefore the curiosity of human minds infects farmers also and he gets to know things. If the instructor is unaware of new things he would be hardly effective in his task.

Another principle no less important is the *Principle of Equality in Communication*. What does this imply ? It implies an environment of equality between the instructor and the learner. This is the commonest weakness whether of the person taking a class or of a person explaining in the farmers' fair some new exhibits to visitors or of the supplier of inputs. However, the person who least observes this principle of equality in communication is the professional teacher and government Extension Officer. Both of them tend to treat the adult farmer as a somewhat inferior person mentally. This attitude has to be given up. Inequality is a great barrier in communication. But perhaps this is also true of the relationship between the media and the receiver of the message of the media. Often we hear radio talks addressed to farmers that are patronising in tone that do not take into account the fact that the farmer is a man of wisdom and experience, that he may be deficient in some recent knowledge but he is not to be treated as a child. He has to be addressed as a person to whom suggestions should be made rather than instructions given. Again, those who prepare posters and

other kinds of audio-visual material have also to bear in mind the principle of equality in communication. Perhaps one of the reasons for the success of the wall newspapers of the Indian Information Ministry is that the wall newspaper approaches the adult citizen in his own right, and not as somebody inferior to whom information is to be conveyed. Wall newspaper is almost the symbol of adult equality and gives to the reader the experience that the reader of one of the national newspapers might get.

The last principle to which I would like to refer is the *Principle of Continuing Self-study* by learners. Unless this principle is introduced right from the beginning much of the impact of farmers' training camps, demonstration courses, etc., would be lost. I have had several examples of the effect of this omission. I visited a centre in a part of India where young farmers had been given a course of about two months and seemed to be quite excited about it. There had been several courses of this kind. I asked the principal of the Centre if he had kept in contact with the former pupils of his courses, whether he could give me a list of the alumni and their addresses. I was disappointed to see that no such attempt had been made. It had not even been thought of. This is true of many a centre that were started during the fifties and that ceased to be the starting point of an emblazoning trail. But the question is not merely of keeping in contact with alumni. The more basic implication of this principle is that learning is a life-long process for a farmer as for any other professional man. So long as he is at the plough or the tractor or in the cattle yard he will have to continue to recharge his battery so to say, through practising over and over again the new skills and securing access to new information. Even with the best of intention and resources it is not possible for us in India and for any other developing country to have a network of instructors for all the millions of farmers for all times. They should therefore be enabled to keep the cycle going once they have been initiated into a training course. This can be done in two ways.

It can be done by putting the former learners on the mailing list of addressees, who would receive new material.

It may be a kind of correspondence course. It may lead to a special bulletin containing columns that will answer questions by farmers. It may mean reservation of special columns in national newspapers. It may provide also for sale of books on subsidised prices. It may also provide for special kind of gramophone records containing talks by top level researchers on problems of special kinds of diseases or pests. It may also mean film strips given to individuals who might afford to have their own slide viewers.

Another way of acting upon the principle of Continuing Self-study by learners would be to persuade them to form themselves into groups. Small groups are not only useful in the initial process of learning, they are also important in the subsequent process of self-learning and self-study. Adults can learn best by talking to one another. This is an effective way of defreezing the cells of the adult brain. Discussion groups have a psychological basis. But there is also a practical basis. These need not be merely discussion groups. They could be discussion-cum-production groups. They should be useful to the farmer in enabling him to get at the latest government circulars and also to reach the offices and centres from where he can get his inputs. In these groups elaborate forms of banking and other credit giving institutions could be examined and understood by participants in any credit programmes. Continuing self-study thus can take various forms but it has to be planned at the same time as the initial training programme is planned.

The consideration of 'Androgogics' for farmers would not be complete without a reference to a new factor that is making a profound impact upon instructional methods today—practically all over the world, and more so in developing societies. Mass media have been examined in detail elsewhere in this book. Here I wish to examine their role in instructional methodology for adult farmers. Radio, television and films have all been used for carrying information. But their use specifically for instruction of adults has hardly been attempted for farmers in India. Using media to assist the Adult literacy instructor seems

a long way off. Some indirect experience is however available, for example, of the impact of the media on the kind of language used in programmes for farmers and its relevance to literacy-teaching. All India Radio uses local dialects in its programmes for the rural people, broadcast from its regional stations. Apart from encouraging local folk songs and other forms, this facilitates communication and understanding. In Central Asian Republics of the Soviet Union and in Azerbaijan, Soviet authorities during the great drive for literacy in the early thirties used the local dialects for the first step towards literacy by the rural people. Standard Russian equivalents came as the second step. This put less strain upon the adults in the learning process. The experience in Ethiopia on the contrary, has been that non-Amarrhic speaking groups of farmers could be introduced to Amarrhic without much difficulty if the instruction is on matters related closely to their work. The commercial Indian film which as entertainment is spreading fast in rural areas uses the standard form of Hindi though a little simplified. It is true, however, that the entertainment film is far removed from instructional ones. Communication is undoubtedly easier with the dialect, initially. When new technology has to be communicated fast, the use of the dialect for sentence-formation would be preferable. In literacy teaching also, the Russian experience seems relevant.

Another influence of Mass media on instructional methodology for adults has been that the instructor can choose from a variety of patterns of presentation that the communicator has demonstrated with success on the radio, T.V. etc. In 1968 UAR had a television literacy project in which both academic and broadcasting expertise was used in transforming the subject matter of the national literacy programmes into television scripts, bringing in all the audio-visual aids to put across the lessons to the learners (illiterate workers and peasants), in a useful and interesting manner. Films, slide dramatization, cartoons, puppets, etc., all were used. For teaching Arabic to women inside their homes, UAR sound radio had in March, 1969, radio programme of 15 minutes duration, broadcast 6 times a week and directed towards individual listeners.

The programme included songs, sound effects and explanations of the various components making up compound Arabic letters. A Unesco survey by John Maddison gives an account of an earlier experiment of televised literacy lessons in French in Ivory Coast. The 75 mts. broadcast was given by a team consisting of an elementary teacher from France and an Ivory Coast educator. The broadcasts were live. On a felt board was pinned copious visual material and a strip of thick paper 45×9 cm on which were written words, phrases, complete sentences not exceeding 20 letters spaces or signs. Drawings on white cardboard or straw, made in black ink often write colour wash background for emphasis, photographs cut out if the background was too prominent. The purpose of the illustrations was to make the written words and sentences and the reading or grammatic problems easier to grasp. A dozen texts from the books were illustrated by a short silent film accompanied by a synchronais reading of the texts.

In Mexico, Radio TV and mass literacy for adults have a common course. Radio TV lessons are for self-learners. Each campaign lasts about six months, 90 kinescape films or Videotapes and 114 radio tapes were used for the campaign. Text-books are provided free by Government. In USA for approaching the illiterates or semi-illiterates in the midst of a highly literate society and a well-developed audio-visual system the attempt has been to use the TV camera to project the image of a carefully selected instructor who could make full use of the visual capabilities of the TV. The course was planned to present content in small learning units of gradually increasing difficulty at a slow pace with frequent repetitions and was known as 'Operation Alphabet'. Similarly with a deft use of close-up, super-imposed images, repetitions and other tricks the Algerian National Broadcasting Company has been able to enrich the literacy programme of the National Literacy Centre in Arabic.

Media programmes for adult learners often use the dialogue method which stimulates discussion among groups of listeners or viewers. This has led to the appearance of a new educational auxiliary, an animator

or group-leader who though not a professional instructor is able to encourage lively participation by members of the group. Participation in discussion stimulates self-expression and in turn conscious efforts at assimilation. The group leader conveys to the radio or TV station the views and queries of the group. Reference to these in subsequent broadcasts fosters self-confidence among members of the group who have also a sense of achievement as they progress with the programme.

The greater the attempt to transform the environment of the classroom into that of a committee the greater the chances of success with adults.

Communication through the use of a multi-media approach is a national necessity in countries with limited resources seeking lasting results. Programming by media calls for planning at the same time as the planning of farm production. The complementary role of sound radio, television, film, filmstrips and other aids for a single series of lessons would be possible through a systems approach.

4

Functional Literacy— Its Uses and Definition

A question frequently raised today is whether literacy has any value in farmers' training at a time when quick results have to be achieved in the wake of a new technology. Today under the pressure of new technology the farmer has not enough time to engage himself in learning the basic skill of reading and writing. He is rather impatient to get at the new inputs and improved practices. In the eyes of people responsible for programmes of development and extension, it does seem unnecessary to waste the time of farmers in these under-developed countries in acquiring literacy, particularly if such literacy is not of direct relevance to the immediate demands of the new technology.

But there are other telling facts too. With over 810 million illiterates in the world, particularly among the developing countries and keeping in view that India accounts for 350 million out of them with 150 million in the productive age group (14-45), literacy for a class of people that has to contribute the utmost in stepping up the production on the farms becomes important. This potentially most effective class for agricultural purposes statistically appears to be related to the per capita income of the developing countries. There are, according to the figures for 1966, published some time ago 28 countries with a per capita income of less than 100 dollars per annum. India and Indonesia are included in the list though the overall figures mask considerable varieties of conditions because of the sheer size of those countries and though since 1966, India per capita's income has slightly increased.

It is significant that in both countries the percentage of

illiterates in the productive age group (14-45 years) is high. In India it is 72% and in Indonesia 57%.

The absence of primary schools at the time that the persent adult population were children and the lack of adult education facilities seem to have had a bearing upon the per capita income. Facilities at the primary stage are still below the mark in countries below the 100 dollars per capita income level. Where the enrolment numbers have increased, as in India, the quality has actually been going down. Some countries it would seem may have to wait until well into 1990's before they have facilities for full enrolment at the primary level.

FAO has in its recent Indicative World Plan for Agricultural Development given some reasons why in the absence of literacy the optimum growth in agricultural production may not be obtainable in most developing countries where more capital and techonolgy may flow. According to the plan, "the overwhelming fact of the developing world is the number of people in it, and the staggering rate at which these numbers are increasing. Secondly, the greater parts are rural and likely to remain so, the majority live at a poverty level of subsistence, most are illiterate or very poorly educated, and around 50 per cent of the total population of these countries are under 20 years of age". Furthermore, it so happens that the areas adjacent to towns are more equipped for agricultural production and for rural industries. But their communication with the literate consuming classes in the cities is hindered for want of literacy on their part. Thus farmers and farm populations in developing countries are "dammed up" in an agricultural reservoir just as a dam in the physical sense holds back water.

The under-developed rural population which is prone to illiteracy will increase at a higher rate sometimes than the better developed urban population. The media of mass communications such as the cinema and the television are getting concentrated in the hands of the literate consuming populations of cities and the image of the village in the films is distorted and unfair to the new rising village. This is happening in India more particularly.

In this way a kind of social dualism is appearing in the developing societies.

In these circumstances one begins to wonder if mass illiteracy could be eliminated over a short period by short-cut methods. Heavy illiteracy and poverty seem to threaten to continue in the rural areas of many developing countries even though the world may experience new marvels of technology. Therefore, a selective approach to eradicating illiteracy appears to be urgently necessary, even if concurrently with mass literacy programmes. The value of literacy lies not only in the difference between knowing the alphabet and not knowing it, it covers also a sharing of the value of all educational achievements which could not have been attained without literacy at the secondary, technical and higher levels, as well as the primary level of education. Can it be possible to reduce to economic terms the gain accruing from literacy ? For example, it should be attempted to determine a relationship between the amount of education and the amount of production based on past experience and to project these requirements. This approach which is based upon the past performance can give broad guidelines for the norms for the future. The second approach could be to study the different levels of income attained by people according to their levels of education. Provided that the other variables could be held more or less constant it could be argued that the additional income attained is due to additional education. The third approach is to derive educational needs from manpower requirement based upon projections of programmes for the future.

A recent study* has revealed that there are positive correlations between the level or spread of education and economic levels but that these connections are loose ones. Economic gains associated with the growth of literate minority may level off quickly the economy remaining on a low plateu, until education (which facilitates access to the retention of new technology on individual basis) has built up to a point at which widespread transformation is possible. In other words, the literacy standards of the

*Reading in the Economic of Education, UNESCO, Paris, pp 113-233 by Bowman and Anderson.

farmers have to be retained at a functional level. It has been indicated that a figure of between 30% and 50% literacy can be regarded as a threshold rate for economic development. For industrial development a literacy rate of not less than 40% is considered essential.

Against this point of view two kinds of arguments are usually advanced. One takes the stand that high incidence of literacy does not necessarily lead to high production. The other refers to certain known cases in history in which despite low rates of literacy in large sections of populations, countries had marked increase in economic growth. Kerala state in India is sometimes cited as an example of the former kind of argument.

With the highest percentage of literacy in India, Kerala cannot boast of very advanced farming. Its farmers are still poor and their economic condition is yet to improve and is far below that of say the Punjab farmer. In this context, is the incidence of literacy among the adults in Kerala of much meaning for agricultural development ? This point has also been made often by agricultural experts who believe that mere demonstrations should be enough. But in the first place the backwardness of Kerala in agriculture is connected not only with the shortage of land but also with the system of ownership of plantations. In the second place, a very basic question is here involved ; there is a big gulf between research institutes and the farmer in that part of the country. Most research institutes are for commodities like coconut, cashewnut etc. Between research and farmers there are two stages of inter-personal communication. First, the experts and officers in the State Department responsible for the development of these commodities and secondly the local district and block level officers who are technically poorly equipped. This gulf continues to be wide not only in Kerala but elsewhere in India too. A foreign observer who has worked with Indian farmers told me that a programme of development, and therefore also of farmers' training, gets distorted because of this gap between the BDO's staff and the comparatively qualified and knowledgeable people at the State Governments. One such volunteer who had the occasion to work on the new

variety of cotton H-4 (which can bring a yield of 20 quintals per acre in an irrigated area such as in Bellary) observed that while working in the field he found that as a result of the first series of promising demonstrations a large number of farmers took to H-4 which calls for an investment of about Rs 2,000 per acre. But recently some sort of pest which is yellowing the leaves appeared. The farmers have been at a loss whom to contact because the block level officers are not so qualified as to be able to take immediate measures. Research institutes are located at big places like Hyderabad and Delhi and even the Bangalore Agricultural University is not so easy of access. In such a situation, a literate farming community would obviously be at an advantage. They would be able to write themselves to the researchers or to the University Extension Department. In this case, of course, they took the help of this foreigner who is personally contacting the research centres. But the point is that for want of literacy a good programme of new technology is getting imperilled in an unsuspected way.

Let us consider the other point of view according to which history has several instances of countries which had large sections of illiterate populations and yet were noted for their prosperity. England and France around the middle of 19th century had very much higher incomes per capita than the developing countries of today, but half of their population was illiterate. But it should be recognised that France and England which were then highly industrialized compared with the rest of the world, had the comparatively much higher advantage of almost monopolistic world trade, possessed large empires and had a long history of capital accumulation in conditions when wages were low and the population's standard of living poor. It is a matter for conjecture if the growth of public education in these countries at that time might have speeded up continuing industrial growth.

Japan and Denmark passed through a different kind of process. The Danish folk schools set up considerably before comparable institutions were established elsewhere enabled Denmark to change its economic structure from that of a traditional agricultural economy to one with the

best and most modern dairy farming. Similarly, Japan with the arrival of the Meiji era in 1867 transformed itself over the following 40 years from a semi-feudal society with much of its population illiterate to a modern industrial economy highly dependent on the skills of its labour force, since it has fewer natural resources of its own.

Can there be a comparison between the effects of literacy and other methods of improving the qualifications of labourers ? A UNESCO study refers to a field study conducted by a Soviet econometrician, named S. G. Strumilin in 1924 in conditions that were similar to those of today's agriculturally under-developed countries. Strumilin has stated that the rudimentary instruction gained in one year of primary education increases a worker's productivity on the average by 30 per cent, whereas the improvements in the qualifications of illiterate workers and the increase in their output, resulting from a similar period of apprenticeship at a factory are only 12 to 16 per cent a year. The improvement in qualification resulting from one year's education at school is, on the average, 2.6 times greater than that resulting from one year's apprenticeship.

However, wherever it is possible to combine literacy training with vocational training as in a number of UNDP experimental programmes, the returns are correspondingly greater.

The Soviet experience however also made it clear that the cost of compulsory schooling is enormous. But the cost of literacy programmes can today be reduced perhaps by making use of other devices. Payments could be made for the capital and materials employed sometimes on voluntary basis. It is not always possible to be positive in underlining the advantages from the gain of literacy into economic terms. However, certain advantages can be distinctly identified. For instance, one benefit flowing from literacy is greater self-dependence leading to increased occupational and geographical mobility. It is true that this mobility may take the form of young people in developing countries going in for urban jobs, thus denuding agricultuture of needed educated talent.

One would be justified in concluding therefore that

Village elders are briefed on the possibilities of starting a youth club in their area.

Spot news for the farmers. The farmers eagerly wait for the news as the two youngsters write it on the board.

Tribal girls learn the three R's in a functional literacy class

for the full benefits to materialise, new kind of education and new types of literacy training better related to development needs should replace the traditional types of programmes. Recent experience of a number of developing countries, particularly of African countries shows that the methods of literacy have to be such as to qualify the literate adult for more farming income on the local field, because the modern industrial sectors in these countries can absorb no more than one-third of those who would aspire to find employment within it. In Tanzania, only about 23,000 jobs in modern sector employment are available in addition to 6,000 places annually in secondary schools but the output of primary school-leavers is much higher. In Kenya, the output of primary school leavers is 150,000 youngsters for whom there are only 15,000 places each year in secondary schools and 40,000 jobs arising in the modern employing economy. One might say that even this would necessitate higher investment in literacy teaching for children. Children's primary education is divorced from their own environment and there is a high drop-out rate and this limits the advantages of educational facilities.

From this it follows that in order to get good economic results and to benefit from the experience of the pilot experiments that have been conducted in various countries, more funds should be available out of national resources for those areas and projects which would be able to take the fullest advantage from such provisions of funds for literacy because of the presence of the other components of development. No doubt industries employing illiterates adult workers may gain priority. But these agricultural regions and areas that are on the margin of the subsistence of traditional economy could also be pushed over without too much difficulty into the modern sector with a little better outlay on literacy.

Most of the experimental projects that are being conducted by UNDP with the assistance of UNESCO have been aiming at higher industrial productivity. Some of them have involved industrial firms such as those in Morocco and Algeria. The factory as a training ground has also been used in a Bombay project in India called

the Polyvalent experiment. A further example of the effect of literacy is available in the textile factories in Isfahan that employed 25,000 workers. Results show definite improvement in efficiency and reduction in errors. As the Unesco report shows in this experiment an attempt has been made to make work-related skills and information as the starting point for all group activities and the pedagogic requirements were subordinated to vocational priorities. The normal progression—alphabet-syllables-words—was reversed to allow technical words to be used globally from the very outset of the technical discussion.

Near Bamako, the capital of Mali, a State farm employs about one hundred regular and several hundred seasonal workers on the growing of tomatos which are canned in a neighbouring factory. Forty-five of the workers were selected for functional literacy classes for two hours a day combined with technical training for one hour a week, these periods being reckoned as work hours. The farm's technical advisor regarded the results as showing conclusively that the cost of the literacy class, that is to say the payment of the teachers and the work time lost was well compensated by the benefits. Formerly the illiterate foremen were unable to check and sign for material and deliver it correctly, or to receive written instructions. Afterwards they could keep very simple accounts, make out invoices and delivery orders, draw up check lists of the number of crates, weights of goods etc. The technical explanation given to them in the field were better and more rapidly assimilated. The whole working atmosphere at the farm changed.

It is true that in agriculture itself it is more difficult to measure the contribution of the individual literate worker as compared with the illiterate except in the case of large scale or mechanised farms.

But the Indian experience has shown that the benefits of the so called Green Revolution might be neutralised unless the skills of reading and writing are made available to the small farmer who otherwise has problems in getting access to the sources of credit inputs and even of the latest information for his increased production. The

small farmer is usually both the invester and the worker. He is also his own entrepreneur, manager, accountant and stock-keeper. The impact of literacy on his production can cover the whole range of his capacities. He is also expected to understand the working of the market and to keep abreast of new techniques. A Bangkok economist S.C. Hsieh has argued that in quite a few South East Asian countries illiteracy has not been an obstacle to familiarising farmers with new technology, because a number of illiterates have been reached through instructions based on other means of communication than the written word. This may be true to a great extent. But it has to be recognised that the illiterate farmer's handicap is more basic and fundamental. In fact, an illiterate farmer remains unequal to the tasks because every now and then new technology is emerging which has to be compared with the older ones and a judgment formed, a choice made. The media of mass communication and of agricultural information do not enable the farmer to retain in full for future references the information conveyed by them. He is always getting out of date. Printed instructions, therefore, could undoubtedly be an advantage to the literate farmer. The value of literacy to the farmers depends to a great extent upon the opportunities for using literacy skills in the daily functioning of the family at work and in the home. The employer of illiterate workers is also interested only in that kind of literacy methods which can give more quick results.

In a developing economy particularly like that in India functional literacy is also a device for providing equal opportunity to the poor man. Inequalities exist even in developed countries where there is widespread literacy. But in the first place the contrasts of wealth are not so great and in the second place in a developing society the inequalities are aggravated by the want of opportunity that are in other democracies available to the literate. In India, for example, despite that recent decision of the Central Government to nationalise banks in practice the small farmer who wants to take loans has to seek the help of a literate intermediary in order to fill up the complex and eleborate forms that are commonly insisted upon by

the banks. In fact, at one place where the branch of a commercial bank was opened, the lawyers of the nearest city found a fruitful field for their operations. The objective behind the nationalisation of banks was to extend the credit facilities generously to the small man. But, with such a decision goes the corollary of providing the tool of literacy that is to say the ability to fill up forms and to submit applications themselves to the prospective beneficiaries.

Government is trying to meet the situation in view of the urgency by introducing the massive scheme of small farmers and marginal farmers in selected districts. In 45 districts, according to a report published in March 1971, a scheme involving about 50,000 families in each district of small farmers (3 to 6 acres in case of irrigated and irrigable lands and upto 7 acres in case of dry land) has been sanctioned. Approximately about Rs. 1.75 crores have been provided for each such district. The flow of credit is to be from the cooperative banks supported by a system of subsidies. The total flow of credit is expected to be Rs. 275 crores. A similar scheme has been drawn up for marginal farmers and agricultural labourers in other districts. In each of the districts a special agency has been set up. This agency will function as an intermediary between the small farmers and the banks in order to ensure quick disposal of the loan seeking operations.

But does it dispense with the necessity of literacy ? Since the scheme has only recently been introduced it is difficult to give a verdict. *Prima facie*, however, even in these districts the handicap of literacy is bound to operate.

In the Unesco study by H.M. Philips (1970) it has been stated that in the case of small or family farms, literacy can change the whole work procedure and psychology of the farmer. The study brings out that the performance of the illiterate workers and his responses are uneven. Partly, this is because much of the printed literature, particularly, government circulars are not adequately and appropriately known to them. The Extension Directorate of the Ministry of the Government of India for example, has published useful mass of literature mostly illustrated, and it also brings out journals. This

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is also being done by Extension Units in various States. Their ultilisation is greatly restricted. A Hyderabad study confirmed that its uses are restricted to the literate farmers. During the early years of the break-through of wheat in Punjab and West Uttar Pradesh, it was the middle level farmer who was mostly active partly because he was able himself to supervise his farms but largely because he was able to get at the information sometimes directly from the agricultural research institutes.

It is true that in India the extension worker, thanks to the wide network of the community development project is available. But most extension officers in India at Block level and many village level workers have learnt by experience to impress their superiors and inspecting officers by showing the progress of a few progressive farmers who because of their better resources, are able to show results in a short time. Moreover in the dynamic situation created by the new technology the Extension Officer is proving unequal to the task expected of him by farmers. The situation is truly depressing in African countries. A recent report by Mueller and Zevering on a pilot project in Western Nigeria (I.L. Review, August 1969) shows that 70% of farmers interviewed on the subject of extension work reported that they had never seen such an extension worker and only 14% had seen one during the half-year period preceding the interview.

The inequality is heightended at the marketing end. It would seem that the typical marketing operations in a developing country are governed by conventions which are heavily weighted in favour of the middleman. The result has been an agricultural tradition of exploitation which was mutely accepted by farmers. But in some countries such as in India regulated markets have come into existence. These are governed by a model act which has been made available to the States by the Central Parliament. Under the Acts passed by the State Legislatures a number of Regulations are issued which lay down the responsibilities of the various marketing committees and the rights and duties of those who come to sell and buy. Instructions naturally have to be printed and issued.

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Of course, they are also being announced on the Radio or orally in the markets. But mere oral communication whether aided by mechanical or electronic device does not help memory nor does it facilitate frequent and ready references when desired. Here again, illiteracy becomes an instrument of inequality and denial of adequate opportunity for want of knowledge. The Fertiliser Association of India as well as a large number of fertiliser companies have issued various kinds of literature for the purchase of material such as fertilisers, pesticides, etc. The instructions are complex even though they are simplified by the manner of presentation. It would appear that if a farmer has to be modern and if farming has to be investment-oriented for the small man then he has to keep a small library of his own to be replenished from time to time.

Those concerned with quick expansion of the new technology and practices of agricultural production point to the success of the high-yielding varieties programme in India and elsewhere as evidence of the irrelevance of literacy to higher production. Demonstrations and audio-visual support such as the radio would appear to be adequate media for the initiation of farmers in the new practices. Literacy being a slow maturing process may not, according to them, be of much use.

Higher production can however be stabilized in a society only when the new technology can be adapted by the large mass of small farmers. There are many impediments in the way of small farmers, many disincentives such as their tenurial position. Illiteracy is another. Illiteracy is responsible for the continuing inequality among the people. The farmer without his own land, without resource, is also one without access to the tool of literacy. He cannot keep the account of the loan taken by him. He cannot record the frequency of the application of fertilizers and water. He has to depend upon others for knowing the latest decisions of Government or of the marketing committee.

Throughout ancient and medieval times literacy was a tool for one or the other kind of monopoly by specific classes of people—priests, merchants or the bureaucracy.

With that tool they prevented the others particularily poor people from encroaching upon their authority and monopoly. One effect of the industrial revolution was that inequalities were reduced. The new occupations were such that even for labour a minimum of literacy was necessary for using the machinery. But in countries where agriculture was still the principal occupation the medieval outlook continued for quite some time. Traditional agriculture had not much use for literacy.

With the recent transformation and modernization of agriculture it is becoming more and more like industry. In this situation, an illiterate farmer is at a disadvantage. Literacy is thus essential if equality of opportunity is to be guranteed and in practice made a reality. The small farmer will continue to be backward if this tool is denied to him. He cannot be independent, he cannot have a sense of self confidence.

It is indeed surprising that this obvious sociological aspect of literacy has not been seriously considered by policy makers. Government of India has a programme of Rs. 1,150 million over a period of 3 years for providing credit and other assistance to small farmers. But literacy does not figure in these programmes. The result will be that the 'crutches' that those programmes provide for the small farmer in the form of service agencies will have to continue indefinitely. The farmer will not be able to come into his own.

Mass media are excellent channels for conveying information and instruction. But except for Television, they lack the personal touch. The printed word gives to the learner this intimacy of a private conversation. It thus strengthen his self-confidence. He is able to verify statements. He can retain a much bigger mass of information for reference whenever necessary.

The slogan therefore should be that literacy is the small man's step towards equality. It is an equipment as essential for his economic development as chemical fertilizers or storage bins. It is an instrument of social justice. A UNICEF study in Morocco quotes an answer given by a lad who was asked why literacy is

necessary. The answer was 'There are those who are learned and those who are ignorant; the first remain poor the others become rich, the first obey, the others command'. It is true that by itself literacy may not be the sole factor in the motivation for adopting new technology but when the economic advantages resulting from a new technology provide an incentive the absence of literacy puts the small farmer at a disadvantage. The nation may still have high production as a result of the progress of the bigger farmers. This is what happened in England and France during the middle of the nineteenth century. They had higher per capita income than the developing countries of today, yet half of their population were poor and illiterate. But this was not because the small illiterate labour was a high producing unit. Largely it was because both these countries had considerable capital accumulations built from their overseas empires where they had also a growing market. Not having the advantages of capital accumulations based upon the empire and a growing overseas market developing countries cannot afford the luxury of having in their society two worlds—the rich and the poor. We must bring all productive units whether small or big on par with each other in the access to productive resources and the skill to use them.

All this goes to establish that a major value of literacy in a developing society lies in its being an instrument of social justice. But it would be wrong to infer that any kind of literacy would be a remedy for the prevailing inequalities, poverty and another ailments of developing societies. What these countries need is production oriented or functional literacy. The term 'functional literacy' has gained currency in recent years and several definitions have been attempted.

In my opinion the difference between ordinary adult literacy and functional literacy is that in the first place functional literacy is designed to give to the learner the skills necessary to perform more efficiently the vocation to which he belongs and to function more effectively in the environment in which he lives. Secondly, functional literacy is marked by the special effort of the instructor so as to design the course and his method of teaching as to

enable the learner to use the skill of reading and writing while the learner is still in the process of learning it. In other words, the learning process itself becomes part of the process of using it for productive and environmental purposes.

The implication of the above definition of functional literacy is that it is not possible in functional literacy to have one kind of uniform syllabus and one kind of uniform primers howsoever psychologically they might have been planned. They have to vary according to the needs of the functions of the learners. The beginning has, therefore, to be made by identifying the functional groups that are to be covered by a specific functional literacy programme. Once this has been done, then, the next step would be to prepare for each such functional group a vocabulary of these special words which are not only commonly used by the people practising that profession or living in that environment but that are also more uptodate. This is because in every profession these days changes are occurring every day. Improvements are occurring in farming, in fishery, in industry, in management, in shopping etc. If the vocabularies get out-of-date then functional literacy would not attract the adult learner. In pleading for different kinds of word lists and reading material for adult professionals, particularly farmers, I am not thinking of lists for anministrative districts or blocks. I am thinking of groups of people with common professions or specialized field of administration. If the profession is, as in the case of farming, dependent upon the ecology of a particular region, then I would regard the group of farmers belonging to a particular ecology as deserving of specific local functional treatment.

Once such specific sets of vocabularies have been prepared then it will be necessary to work out structural models having these words in particular, and at the same time, introducing the learner to the script. The script and the language become part of one process of learning. In preparing these models the requirements of adult psychology have to be borne in mind. The normal educator in the name of simplicity produces sentences on topics that are altogether elementary for the adult practitioner

of a particular profession. Such learner feels somewhat humiliated in being asked to follow the juvenile learning process. He wants adult reading right from the earliest stages. A question has been raised that the words that are essential for modern technology and are even getting known to farmers or workmen are too complex to become the basis of the introduction of the adult learners to such an elementary thing as the alphabet. This on the surface appears to be a strong objection. But simplicity is a highly variable term. Often a North Indian regards a simple Tamil word as highly complex. What is complex is the concept behind the word or term. But in the case of farmers adopting the new technology or of workers engaged in advanced practices in industry, the complexity of the problem no longer arises because for various reasons they have already been exposed to those complex processes and it is the inability to read or write these words which stands in the way. It would, therefore, be worthwhile to make an attempt even with the seemingly complex vocabulary in order to introduce the learners to the alphabet through such lists of specialised words, terms and expressions.

Literature for those who are thus becoming functional literate includes both the primary material as also the follow-up material. Both the primary and the follow-up material, have to be useful to the learner in his vocation. The whole idea of a uniform kind of textbook and primer has to be re-considered, for those who are to be covered by functional literacy programmes. Instead there have to be different kinds of teaching material and follow-up literature for different kinds of learners belonging to various professions. The production of diversified literature or reading material for various specialised disciplines or vocations may be expensive particularly in the beginning. Expenditure may also increase because of the changes that are being effected in most technologies from year to year requiring frequent revision of reading material. Quite a few organisations that have published reading material for adult neo-literates have got huge stocks of undistributed material which is now out of date. In these circumstances it may be more

practical to make a beginning with the preparation of cyclostyled or mimeographed material. Insistence upon the quality, and usefulness of the contents will be necessary rather than upon the quality of paper, printing and layout. The farmer wants something of immediate use which is authoritative and the latest and which he can try out in his field. It is the same with people of other professions. When the Intensive Agriculture District Programme (IADP) was started back in about 1961 in a few districts (of which the number is now reduced only to seven) each such district was provided with a printing machine of its own for bringing out instructional material. These are off-set printing processes which have in some cases done useful work. From cyclostyling material, perhaps that might be the next stage if the number of participants in the training programme increases. The main point is that the material meant for instructional purposes is different from material which is usually brought out by government organisations for publicity and information purposes. The later is simple in content but lavish in display, the former is functional and advanced in content but simple and unostentatious in display.

Functional Literacy in order to be attractive must hitch its wagon to the process of development. In other words, it should be specifically linked to those programmes of economic activities which are forward-looking, which are part of the development process, which are not merely of the routine type. The methodology of teaching, therefore, will be really the methodology which covers the teaching of the alphabets along with the teaching of packages of improved practices or of the new mechanical and other skills that are required for those functions.

The instructor in adult literacy is a colleague of the learner in the development process. He is deeply involved in the development of that particular economic activity in that particular area. If he happens to be a school teacher then it is incumbent upon those who are organising this programme to enable him to have a more intensive practical experience in that economic activity. A superficial training in farming or industrial workshop, etc., will just not do. The farmer or the worker will not

take such an instructor serious. The result will be that a big gulf will be created between the teaching of alphabets and the teaching of improved practices. The moment that happens a functional literacy pragramme collapses. Instead, we would only have the conventional adult literacy programme and the conventional teaching training programme. I am not denigrading either of these. But there is no use going in for a functional literacy programme and not choosing instructors with care and with the objectives mentioned above.

Instructors may be those who are themselves involved in that particular economic activity such as agronomists, engineers, doctors, nurses, skilled craftsmen etc. In that case they should be enabled to learn the principal elements of adult psychology, the basic factors in the communication process, the methods of instructing adults without making them feel like juvenile learners etc. This really means a reverse process too ; on the one hand a promising teacher has to learn the economic or developmental activity if he should be an instructor of functional literacy, and on the other an active practitioner of an economic activity in development programmes should learn the methodology of teaching adults, the alphabets and the vocabulary.

What about follow-up ? The responsibility lies upon those who give loans for economic activities such as banks and cooperative societies. Distributors of fertilisers and chemicals, and those who give machine tool parts etc., are also responsible. In the case of large industry, the responsibility is upon trade unions. Agriculture Departments like some other government departments are equally responsible for this kind of follow-up.

It has been a sad commentary on most of our previous attempts at organising functional literacy that an alumnus is seldom in contact with those from whom he learnt. Bulletins, letters to the editors, reservation of columns in newspapers and periodicals for neo-literates, production of serious literature, these are part of or the logical culmination of a programme of functional literacy. In general literacy, a public library is often regarded as a

useful service for follow-up. But a beneficiary from functional literacy would require a personal collection of pamphlets, magazines, latest instructions of government as well as of agencies responsible for credit and inputs and similar other material that should constantly be kept up-to-date. A person functionally literate is not learned in the academic sense, he is knowledgeable in the practical sense.

5

Informing and Communicating with Farmers

The term 'Agricultural Information' gives the impression of being rather diffuse and, paradoxically enough, also rather narrow. It is diffuse because while it embraces the use of various media in communicating information about agricultural matters, it does not define the recipients of this information who might range from town dwellers, curious to know about trends of production that influence prices in urban markets to extension workers and the farmers themselves. It is narrow in the sense that it would seem to imply at the level of the farmer, only the communication of information, not necessarily the steps necessary for its assimilation and for the feed-back.

Information on agriculture for the general reader or listener or viewer is something quite distinct from information meant for farmers actually engaged in specific production activities. For the latter, it is not possible to consider information except as part of training and extension, and indeed of the production process itself. Information in Farmers' Training programme is not meant just to be disseminated ; it has to be part of demonstrations so that new skills and techniques are learnt as one tries them out in one's own field or sees them being given a trial by another farmer.

Of course the media of information have a preliminary function too, namely, to create an environment favourable to the adoption of the new technology of agriculture. This is what is called the motivational function of the media of information. Though some studies have been done to identify and establish the impact of various

communication media in motivating Indian farmers, the fact is that the recent break-through particularly in the wheat areas has been motivated by two clear economic considerations. The first is that the dwarf varieties of wheat meant a substantial and not marginal increase in yields and the income of farmers. So long as the adoption of new practices (seeds, fertilisers, water, plant protection, etc.) resulted only in a marginal increase in income, the farmer in the monsoon land was cautious about investing his meagre capital in these inputs. The new varieties, however, meant 3 to 4 times per acre yield of that from the indigenous seed and this considerably reduced the element of uncertainty and made the investment worthwhile. Secondly, the prices available to the farmer have been distinctly advantageous to him and compared to the cost of production, provide a welcome margin of profit. Purchases by the Food Corporation of India have naturally facilitated this process.

Until these two factors came into play, the various kinds of persuasive material that was being put across by the radio, films, newspapers, posters, slides, etc., could not convince the farmer and motivate him to make the investments. Does it follow that in the motivational stage information media are not relevant to the farmers ? That is not so. It is the success stories of those who used dwarf seeds initially that created the environment favourable to this new technology. Success stories need not be romanticised. They should be factual and should anticipate some of the doubts that the farmers may raise. It is a welcome sign of the times that success stories of farmers are now being displayed prominently sometimes even by national newspapers. Apart from convincing the farmer, prominent display of success stories gives a sense of self-confidence and brings farming into the main stream of life.

Does direct talk and exhortation in the form of radio talks and press statements by VIPs result in motivation ? By and large it does not. Even if not saying so, many a farmer would look upon such a talk as a ritual of little significance. But a straight talk from an important person such as a Minister becomes meaningful when it is a policy

statement or when it discloses any important decision by authority.

Motivation can be direct as well as sub-conscious. Marshall Mcluhan believes that the electric media such as radio and TV are so rapid in commuicating with the sub-conscious that regardless of what is conveyed, the media in themselves become a factor in the thinking process of the recipient of the programme. In my opinion, this rapid communication by itself may be effective as a motivating force for acquiring consumer goods in societies that are affluent. But in poor and developing societies, its effect may well be to create an 'itch' among those who do not have the means to satisfy it. Moreover, agricultural development in a poor society implies effort, supply of inputs and the application of those inputs through a new technology. The image that the rapid electric media might instal in the sub-conscious cannot be a motivation strong enough to persuade the farmer to apply himself to these tasks. Also the very rapidity with which the latest information can today be carried from the most developed and affluent societies to the backward poor ones creates an anomaly. It creates a desire for the latest craze among people whose own technology is still developing. Some farmers in India got excited about remote control tractors and harvestors shown in films about Canada and US. But with the abundance of labour that we have and the meagre resources that a farmer can command, an intermediate technology is more appropriate than a very sophisticated one.

That is why the proposed use of satellites for the communication of agricultural information is unrealistic in the Indian situation. Simultaneous diffusion of the same kind of information in all parts of India based upon the latest techniques is not going to lead to the adoption of new practices by farmers. The TV picture though brought to the close proximity of the farmer will still be remote, unachievable like a mirage. Even the success stories will have only limited use for others.

The moral is that agricultural informationin order to be effective has to be purposive, precise and relevant to the local situation. These are the charactertics not so much of

motivational information as of instructional information. Of course motivational information of another kind may follow the adoption of improved practices. I am referring to the information carried by advertisements for particular brands of agriculturai inputs, machinery etc. These have been known to create an impression because the particular audience is already using pumps, machinery and inputs. The object of the motivational image is not to modernise the farmer but to enable the modernising farmer to make a choice on the basis of his needs and the claimed merits of various goods.

Effective motivation for adopting new practices comes from demonstrated economic advantages and from the incentive of remunerative prices. Demonstration is therefore the primary source of motivational information. It is also the most effective method for instructional information. Of course, demonstration of new technology has to be participational demonstration, that is, one in which the farmer participates rather than one which he merely watches. The drawback with much of the demonstrations that used to be conducted on Government farms until 5 or 6 years ago was that the farmer was hardly in it. But when the new varieties of seeds were introduced, some research institutions arranged for some scientists to lay out demonstrations on the fields of a few typical farmers in the neighbourhood. The farmers themselves did the various operations under the guidance of scientists and with some help from the Institute. The success of these farmers spread the message fast in the neighbourhood. Interpersonal communication followed. Now, such demonstrations are laid out in over 100 districts—about 15 demonstrations in each district—and are covered by a centrally financed scheme of National Demonstrations.

Next to demonstrations, the most effective means of carrying information for agricultural development would, in the Indian situation, be the radio, provided the use of the radio is accompanied by certain specific kinds of inter-personal communication. In 1965-66, a comparative study of the impact of radio and printed material was conducted in India and Costa Rica, under the auspices of Unesco. The Indian part of the study was done by the

National Institute of Community Development, Hyderabad. This study confirmed (what had earlier in 1956 been noticed in the study of Unesco A.I.R. project with which I had been associated) that radio has a greater impact when combined with inter-personal discussion at the receiving end, by farmers' forums, and that printed material has rather limited effect by itself. Partly this effectiveness of the radio could be attributed to the impression it creates of enabling the receiver to get in direct communication (one way though) with somebody remote but authoritative. The radio becomes a voice of authority and of expertise. In the early days of the introduction of the dwarf varieties of wheat some farmers in Punjab and West U.P. were known to sit with pencil and paper whenever the A.I.R. put over a well-known agricultural scientist.

Here it is necessary to underline certain pre-requisites for effective communication of agricultural information on the radio. In the first place, the radio programmes should synchronise with the timings of the various stages of the agricultural operations concerning which information is sought to be conveyed. Advance scheduling of radio broadcast should depend upon the advance planning of agricultural production in a particular area to which the broadcasts are directed. There is no point in talking about foliar spray of urea when the farmer is busy irrigating the crown roots of the plant. It would even be better if the radio schedule and the schedule of demonstrations on farmers' fields could be more or less the same, so that the radio would confirm and clarify and supplement that which has been demonstrated. Secondly, the content of the radio programme and its presentation should be professional and of an adult standard. These particular broadcasts are meant for people with practical experience and wisdom, and it will not do to talk down to them and to over-simplify the issues. At the same time the language has to be the language of the farmers themselves. In the particular study to which reference has been made earlier, the Lucknow station of A.I.R. had to change the language of the script into the dialect of the listeners. Most talkers, however, use the standard language

of newspapers and magazines. This impedes effective communication. Thirdly, every broadcast programme should provide for the discussion of inquiries made by listeners. Answers to questions should not be evasive nor general. They must seek to help the farmer rather than to observe a formality.

All this points to the fact that the radio for agricultural information has to be local. Its coverage should be the area with similar agro-economic conditions and similar production programmes and problems. All India hook-ups are irrelevant. At one time it was even proposed to have a transmitting unit for every district. At present there are 24 special farm broadcast units. (These are called Farm and Home broadcasts units) in the country, and more are contemplated. While there are arrangements for mutual consultation and coordination between broadcasting units and agricultural officers, synchronised scheduling of the kind to which I have referred above has been possible only in a limited way. Greater involvement of the broadcasters in the agricultural field plans may be desirable.

It was back in 1936 that the first radio broadcast for villagers were introduced on the AIR. A little before that during the depression period in Canada, an attempt had been made to promote farm standards by broadcasting on the Canadian Broadcasting System special programmes for farm groups. These farm groups were called farm forums that met at the homes of radio owners and discussed the programme, expressed views, sent questions to the departments and looked for answers in the subsequent broadcast. On these lines, a new experiment was undertaken by the AIR in 1956 with the help of Unesco in 145 villages of Bombay, now Maharashtra State. In each village, a radio Farm Forum consisting of 12 to 20 members mainly farmers was set up, each with its own convener and chairman. Twice a week for ten weeks, a special half hour programme meant for the forums was broadcast. The forums would assemble half-an-hour before the broadcast, hear preliminary remarks from the convener, listen to the radio programme and then hold a discussion. In the course of the discussions,

members expressed their views, sifted items of new knowledge, questioned certain assumptions and asked for clarifications. The conveners sent their reports to the radio stations which referred queries to the specialists in agriculture and other departments and in subsequent programmes tried to answer them. Some forums followed up the discussions by organising group action on those lines in the villages. The programmes were on specific projects relating to farming primarily such as rat menace, poultry farming, cattle improvement, schools for little children, quack doctors, etc. Part of the time out of every programme was devoted to questions, comments and doings of the forums based on reports from them. Nearly 17% of the forums responded.

A survey conducted by Paul Neurath in 20 out of these 145 villages gave the following results : first the level of knowledge of individuals nearly doubled in the case of forum villages while it rose by not even 20% in the case of non-forum villages. Secondly, 20% of the forum members participated actively in group discussions, 50% variously and 30% were not active. Thirdly, radio Farm Forums seemed to emerge as new and informal institutions in the democratic process in the villages. Some villagers organised exhibitions and cattle shows, undertook road building and well improvement, inoculation of poultry,—all this on their own. Participation in discussions of rural problems outside the formal body village Panchayat or executive committee was itself a stimulating experience : it was also a training in the art of organised discussions. New opportunities for leadership also came to the fore. Fourthly, the forum provided a basis for evaluating the popularity and effectiveness of various kinds of programme presentations. Between 60 to 80% of the members interviewed, expressed an intensified desire to apply the skills learned from the programmes. Also, active participations in discussion was generated more by programmes on topics on which the farmers could speak from their own experience and less stimulated by topics outside the sphere of their everyday knowledge.

Since then mass media in India have had further opportunity of being used to promote new trends in farming. Tnese opportunities have disclosed that in the first place the mass media should be used in a coordinated manner. Today, Government of India has on the field a number of field publicity organisers moving about in jeeps along with film projectors. The Extension Directorate of the Government of India has special presses for preparing printed communication. Visual communication is provided by farm instructional films prepared by the Films Division of the Ministry of Information and Broadcasting. One trouble with all these communications media of field publicity, film shows, radio broadcast has been that though they present a general composite image of development, of achievements and aspirations, they do not always concentrate on issues that are specific to the special groups of audiences. This can only be done if their programmes are organised right from the beginning around the specific problems of special areas. New radio stations have been brought into being in order to serve this purpose in certain specific areas. Nevertheless the problem remains how far the programmes can be local and how far they can be related to actual projects. There are a number of projects for which specific audio-visual programmes are necessary such as those in the areas requiring land levelling and land development. Emphasis should be largely upon communication as a tool of development. The attractive picture of modern life that the film conjure up appears as real only to adolescents many of whom do look forward to an opportunity, on growing old, to live that way. A more immediate urge with them is to press their parents (who do not share the image) to increase their allowances, but not to begin their own earnings. All this leads to wasteful frustration and friction. That is why in rural areas it is not so much the mass media as the examples of individuals with experience of urban communities that are more real as a goal to this type of villagers.

For the Indian rural people one might add that a decisive factor may well be the techniques of production, the language employed, the themes chosen, the characters

introduced for conveying the message, image, skills, attitudes, etc. This is the fifth significant issue that merits consideration. Compared to newspapers, books and pamphlets, the film and the radio in India are nearer the people because the oral transmission of information is still living a tradition in Indian villages. Feature films use a standard colloquial language—mainly urban. The radio, while addressing urban audiences, uses a more academic language for various reasons including the need for finding or coining new words for Western concepts and current affairs. But the rural programmes (broadcast one to one and a half hours every evening) are in rural dialects mostly, and in that respect the regional radio has a distinct advantage over all other media. Printed publications and pamphlets and even slogans are often originally conceived in the English language which, to the expert at the metropolitan level, is still the language for any new technology such as the technique of communication ! Attempts at translation lead to odd results and the one casualty is communication. It is relevant to add here that practically all Indian languages newspapers used the same kind of artificial language which, to the coming generation of the educated, will no longer be artificial. (Some of the Indian language terms over which English educated people laugh are the ones with which the new school boy is more familiar than he is with the English terms.) Also the argument that the Indian feature film uses a colloquial language overlooks the fact that the feature film does not talk about politics, techniques of production and theoretical concepts. The problem is not that of using simple language in the abstract, but of scripts being originally conceived in the languages of the people.

The pre-testing of programmes is important, so that the specialist communicator takes into account the social ethos which includes both traditional culture and the psychological needs of the rural people at a particular moment. Traditional forms of culture were used, in the past, to act as a link between the mobilised individual of cities, and the physically settled and mentally reposeful individual in the village. The new media tend to break that link and widen the gulf between the two segments.

It should be the task of the new communicator to adjust his technology to inherited forms of culture (just as an engineer has to adjust his technology to the situation of the craftsman in the village). He will not only reach the villagers quickly, but will also impart to them a new sense of confidence. When, in 1952, Prime Minister Nehru decided that a special festival of tribal and rural dances should be held every year at New Delhi, there was a sudden and unexpected feeling of self-confidence among the countless humble people over this striking recognition of their expressive personality. Communications media can have no serious difficulty in adopting these forms for more specific uses. In the Kerala state of India, the *Chakyar* or the mono-actor follows a very old tradition of introducing into a classical piece, extempore running comments on current affairs. James N. Mosel has described an interesting innovation in Thailand, based upon a tradition. In is a commentary written in verse, appearing on the editorial page of local newspapers and usually accompanied by a montage cartoon. It is easy to remember, and its purpose is to raise doubts, suggest issues and introduce moral and sentimental aspects of a problem. "By moving editorial material from the printed page into the oral system, the verse editorial can greatly magnify public impact."

Improvisational nature of rural 'shows' makes adaptation easy. The important thing is not to let the traditional setting freeze the theme and characters. In fact rural songs and plays often respond to the stress of a new situation. Tribal women of South Bihar, when they saw, during wartime, revenue officials of the then government measuring their fields to be acquired for the location of barracks for armed forces, made out a song : "You have come to measure the length of our fields ; why don't you measure the depth of our empty stomach ?" A popular rural character of radio in Bihar is Loha Singh—a retired soldier whose oddities are an unending source of mirth. Two years ago he decided to become a progressive farmer, and his 'exploits' are much more meaningful than before. When the Chinese invaded India, he was of course even more 'active'.

It is such shifts in themes that film producers in the Soviet Union utilized for reflecting the changing needs of the Russian revolution. Alex Inkeles has observed four such shifts—camera focusing on mass movements in the twenties, on great building projects and collectivization during the Five Year Plan period, on the individual hero and patriot from history immediately before and during World War II, and on the 'new Soviet labour hero' dedicated and hardworking, after the war (and until the coming of Khrushchev). In a free society even with its demands of development, such planned consonance of national needs and cultural communication is not possible. But highbrow cultural experts and communicators will do well to study without prejudice the characteristics of India's rural songs, drama and entertainment, the most universal of which has been their readiness and even keenness to be used as a vehicle for a message. The promoters of the Bhakti movement in the Middle ages, like Sankaradeva of Assam, Chaitanya of Bengal, Vallabhacharya of Braj and several organisers of Bhagwata Mela in South India used these forms consciously and unashamedly for communicating their messages. Sophisticated city audiences do not need this approach, but the villager does not regard art for art's sake or for the sake of entertainment as the only proposition.

Indeed, communication for rural development can be planned more effectively if the producer, the subject specialist, the local culture expert, the writer and the technical man function as a team. Such teamwork is seldom seen in programmes even of documentary films and radio in India because all the fellow workers are not sufficiently drawn into the central task of communication. The writer aims at aesthetic satisfaction for himself, the engineer at the perfect finish, the subject specialist at the encyclopedic effect. The local culture expert has not been on the scene at all. In a special series of T.V., for Citizenship Programs for New Delhi's experimental T.V. station, improved teamwork was attempted with notable success, and the engineer and writer were able to feel their educational responsibility almost as much as the educator himself.

Compared to the mass media communicator, the interpersonal communicator has better opportunity for being deeply involved in the message he conveys. This brings us to the sixth issue—the emphasis placed on interpersonal communication in rural areas. Earlier in this chapter we have seen how the large network of Social Education Organisers and Publicity officials operates in Indian villages. That governments in free India have ungrudgingly spent money on this personnel, is due partly to the fact that rural people cannot yet afford to buy radio sets and other modern reception facilities. Low cost transistorized radio sets will no doubt make a difference in course of time. National leaders have, also, a more practical understanding of interpersonal communication. The public meeting was the principal medium of information and inspiration during the freedom struggle, and it was thought that it would continue to be so in the process of reconstruction in free India. Information and publicity officers in the countryside operate on this assumption. But experience shows that though there is still a strong curiosity to hear important leaders, the public meeting is essentially a tool of mass crisis rather than of specific task-orientation. A more effective technique is person-to-person talks, discussions, and guidance. It is far more effective than modern mass media which, according to various experimental and survey groups, operates upon attention, information, tastes and images, but far less upon skills and attitudes.

For this kind of person-to-person communication, the Publicity and Social Education organisers are ill-equipped psychologically. It seems that on a personal and group level they (urban educated small elite as they are) tend to contact the better-off sections of rural society mainly. An official survey of the perception of national emergency in villages of India held in 1963 showed that (in a sample of 3,000) 4 people out of every 10 had heard of the Chinese invasion from 'friends and neighbors'. It seems also that more people had got their facts from the village shopkeepers than from village officials. Surprisingly, fewer still had turned to the village teacher. This runs counter to the proposition of some observers that in a traditional

society "information itself is considered sterile by the individual villager until someone of status has interpreted it." The shopkeeper is by no means a person of higher status than the village official or even the village teacher.

A comparison of the interpersonal communication system in Indian villages with those in the Soviet Union and Chinese Republic would show four differences : first, the Indian communicator is an official, while the Soviet local 'agitator' as he is called, and the Chinese progagandist are workers and farmers themselves, who undertake this additional duty in a spirit of dedication. Not only is their number large (according to Frederic C.T. Yu there were 450,000 propagandists of this kind in Shantung Province alone, in 1952) they are also more strongly convinced of the correctness, significance and meaningfulness of the work they are doing. As Alex Inkles has pointed out, "the confirmed Bolshevik, the vigorous believer in the correctness of the Party's policy and its general line, forms the backbone of the agitator's care". Secondly, the Indian official is not a fellow cultivator or foreman and even when he is on the spot, he represents, to the poorer peasant, a distant and impersonal force associated with the motor van and the contraptions that he carries, than with the dusty earth over which he walks. To some extent even in China and the Soviet Union party men had this drawback as the 'first togethers' exhortation upon Party workers in China demonstrated. But the Indian Officials' educational background has a more crippling effect. Thirdly, the Soviet local educator being a non-official, acts as an alternative source of information on the attitudes and state of mind of the population to decision makers. But the reports which the Social Education Organisers and Publicity Organisers furnish are mainly concerned to impress their superior officers with the number of meetings organised, centres inspected and shows given. Assessment of public reactions is indicated in cautious terms and seldom are critical and unfavourable opinions expressed. Fourthly, the Indian interpersonal communicator does not have the benefit of a thorough initiation in the techniques of personal communication. Social Education Organisers are not sure whether they

should stray into the domain of publicity, and Publicity Organisers do not still have proper training programmes. Such principles as selection, juxtaposition, styling, timing and repetition are not known to him. Thus, much depends upon the native instincts of the communicator and when he is deficient in them, he tends to lean heavily upon administrative instructions which are, after all, no substitute for techniques of communication.

The thoroughness and modernity of the Chinese techniques of educating their rural masses and local leaders show how formidable a psychic power of indoctrinated millions lies behind the Chinese armed forces that threaten India. This brings us to the seventh issue. We have seen earlier in this chapter that elaborate programmes of the training of village leaders of all kind are being now implemented by the Community Development Ministry and state governments in India. But these are nothing like the 'thought reform' in China. 'Thought reform proceeds to rid the people of their 'wrong notions' by a process of self-criticism and self-study. Every factory, farm, residential unit is divided into study groups under Party approved leaders. Some documents are assigned and the object of the discussion in the groups is to integrate realistic situations with those documents. Everyone has to talk. In conclusion, study-conclusion or part-conclusion is expected from each participant who is to expose or confess his 'erroneous idea, wrong attitude and inadequate outlook'. This is, according to Frederick C.T. Yu a perfect system which fits in with psychological principles of Freud and Jung, an "ambitious Communist design of thought reforms as a special tool or method of persuasion to bring the thinking of the nation in line with that of the Party and to compel the people to internalise...the Communist doctrine and information."

T.V. is still new to India and it is not possible at this stage to assess the comparative merits of radio and T.V. It is obvious that on the T.V., the visual image facilitates greatly the message of the spoken word when complex techniques have to be explained. In the transition from a manual and labour-intensive technology to a machine-based technology, the personalised idiom of television gives to communication a new dimension. It makes the

process of learning easier by promoting familiarity with the machine and the tools which, to the listener of instructional radio programme or to a spectator of a film audience, still remains remote, strange and somewhat inhibitive. By concentrating or forcing the eyes to concentrate on the particular part of the machine or its operation the television, so to say, stills the inhibitive force in the brain. The machine or the tool becomes a part of the environment of the viewer. This familiarity with the new input or tool,—it may be fertilizers or a new drill for ground water or a power-tiller, gives to the recipient of the information a sense of confidence in handling it at the later stage.

The confidence is further strengthened by the conviction that goes with the communicator's personality. The television programme would not go to an ordinary mechanic to demonstrate on the television the mechenism. He would rather have it demonstrated by an engineer-and by the inventor himself, if possible. The result is that the viewer has the confidence that he is being given the demonstration by one who should know. The association of a sense of conviction with the personality of the communicator is easily attained in any electrical media but more so in the case of television because here the communicator moves into the environment of the receiver of the programme. The television does intrude upon the environment and in so doing transforms it.

The experiment of Krishi Darshan in Delhi was initially handicapped by the novelty of T.V., which attracted large miscellaneous crowds at the community sets installed specially for farmers. Consequently the special audience appeal of Krishi Darshan is diluted. Moreover, the coverage of Delhi T.V. is restricted to villages surrounding Delhi. As a result of proximity of the Indian Agricultural Research Institute, the higher literacy percentage in the area and also the generally modernizing environment of the metropolis, farmers in these villages would not be drawn towards telecasts unless they tackle their more complex problems of which the solution is not more easily available through other means. Much of the farm programme on Delhi fails to reach that level of sophistica-

tion. It might do for less advanced areas. Moreover, Delhi T.V. does not have the facility of Mobile Video tape-recording. Consequently, the outdoor programmes have to be limited to either those covered by cine camera or to places where the outdoor link T.V. camera can be carried.

Whether with T.V. or with Radio, the validity of agro information programmes, depends upon what happens at the receiving end. A common weakness of programme-producers on these media is that they derive satisfaction mainly from the achievment of producing a quality programme and have little emotional involvement in what happens at the user-end. But as has been stated earlier, several studies have shown that radio programmes have a noticeable impact only when backed by the inter-personal process of follow-up discussions by the listeners. In fact this kind of inter-personal support is equally essential for field demonstrations. There, however, it takes the form of farmers' gatherings at the demonstration points on fixed days when scientists and experts can explain the operations and answer questions, etc. For radio programmes such large gatherings which used to be a feature of the early days of community listening in India are almost useless so far as assimilation of agricultural information by the listeners is concerned. In my study (jointly with Dr. Paul Neurath) 'An Indian Experiment in Radio Rural Forums', I have explained how and why the shift has occurred from community listening to 'group listening'. By a group I mean a small homogenous group of adult farmers—about 15 to 20 who have a professional and not a passing interest in broadcasts that are designed to suit the particular farm technology in which these farmers are involved. Such a manageable group can follow up broadcasts by discussions and criticisms, leading eventually to their communicating with the broadcasters for clarification or more imformation. This kind of clarification they would get at subsequent broadcasts and thus the desired two-way channel of communication would be established. In this process, the listener members of the group are almost compelled to activise their critical faculty and to verify from their experience what they hear. Such a process obviously accelerates

learning and assimilation. Needless to add that what is true of the radio is even more applicable to T.V. A.I.R. has been able to organise listening forums of this kind in some parts of the country even though the proportion of active forums may be small compared to the statistics claimed *i.e.* more than 12,000 forums in the country.

Film producers tend to be even more restricted in their understanding of the communication process because of the easy satisfaction that they derive from the aesthetics of a good production. India has one of the best documentary Films Units in the world and the section responsible for agricultural information films has produced several outstanding and award-winning films. And yet it cannot be claimed that these films succeed as tools of instruction to farmers in respect of new technology. They are at their best in depicting the changing environment, in stimulating the desire to change, and in highlighting the contrast between beackwardness and progress. One reason why they have not so far been effective as tools for imparting the skills is that the economics of film making does not permit the production of a large number of specific local interest films. In order to do that, experiments in the production of super 8 mm films with simple equipment have yet to be undertaken in India. Also in a dynamic situation like the present one, documentaries based upon yesterday's technology get dated only too soon. Documentary production in India is a time-consuming process while to be useful as learning tools films have to be produced quickly and at low cost. Moreover, the showing of documentaries on agriculture does not follow the farmers' needs. Usually the mobile vans of Field publicity Organisations show these films to large crowds along with a number of other propaganda and information films. There are projectors with Universities and Departments where the audiences may perhaps be more specific. In either case film showing is not linked to the farm operations and no time schedule is drawn up on that basis. Audiences are large and there is no opportunity for discussion which as a means of assimilation has proved to be the most important support to any medium of information.

Exhibitions have in India been in a modest way perhaps more effective in conveying information to farmers than the newer media. Exhibitions and shows depend for their success upon the 'cafeteria' method. Most farm shows have as exhibits commodities that are 'real' to farmers. Photographic displays also provide them opportunity to see people like themselves in action. Secondly, as a contrast to the electric media, the very slow and gradual exposure given by exhibitions and shows enables farmers to make their choices and to allow information to percolate in the light of verification and comparison with their own experience. Here is an example of a method of agricultural information which corresponds to the pace of intermediate technology. Thirdly, in the recent situation when the farmer has become keen and eager for the latest information on high-yielding varieties and multiple cropping the organisation of Farmers' Fairs has followed a welcome composite pattern. It includes an Exhibition presented by experts, an exhibition of the best that the farmers bring and finally a question-answer session providing an encounter between farmers and scientists. Wherever this combination has been possible the Farmers' Fairs have been an effective tool both for accelerating the learning process and providing opportunity for recognition. Related to exhibitions, fairs and shows, is the technique of displays, using various kinds of visual aids, such as flanellograph and silk screen pictures and slides. These have been used successfully in class rooms and are a low cost and convenient aid to the extension worker. What is important, however, is that they should be renewed from time to time so that they respond to the changing situation and the extension worker is able to provide answers to problems facing the farmers.

Mobile exhibitions mounted on specially designed and fabricated vans have been tried with success particularly in remote areas. Agriculture Ministry of India began with 34 such vans. But a large country like India needs many more such units. Moreover, farmers would find Exhibition vans more worthwhile if these could be Exhibition-cum-Service Vans. If for instance a Van could carry facilities for pesticides spray, or for application of micro-

nutrients or for the repair of improved tools it would attract more responsive visitors to its exhibits. Again, such Exhibition vans could also function as carriers of information regarding local problems in the reverse direction, that is, from the farmers to the researchers. Multiple use of facilities like these is unfortunately often ignored in developing countries where resources are limited.

Research is, however, necessary for a more compact and less costly audio-visual contraption that can be operated by farmers' groups themselves without having to depend upon technicians. Videorecord players would technically seem to provide the most self-contained audio-visual experience but are expensive. Unfortunately, the needs of the developing countries have not received the attention of researchers since most research has been carried out by big manufacturing concerns who do not always find it worth their while to produce low cost commodities for the use of villagers.

How does the printed word compare with these audio-visual aids as a medium of agricultural information ? In a country with about 150 million illiterate adults, the majority of whom are in the rural sector, the printed word has obvious limitations. Much of the material which is being produced in the form of books, pamphlets, bulletins, hand-outs and brochures is useful for literate leaders of farmers and extension workers. It will be some time before such material can reach the majority of the small farmers. However, there are two uses for the printed word. In the first place, inputs such as fertilizers, pesticides, machinery, etc., that are supplied to and used by farmers, have to be accompanied by directions containing both the printed word and the sketches. Every purchaser needs such material even if he is bound to get it ready by the literate neighbours or somebody else in the village. Unfortunately very few supplying firms have cared to use this opportunity for providing information material in Indian languages and in the language of the farmer. Most of the directions still are in English which naturally limits their usefulness in most villages. Secondly, the information material directed towards younger literate and energetic farmers can well be the nucleus for farmers'

reading clubs. This can have an effect similar to that of radio talks and a kind of indirect correspondence course even for neoliterates can thus be arranged. Except in one or two places this technique has not been tried.

It is here that language newspapers have a role to play. Political consciousness reached the Indian villagers faster than the awareness of the potential of economic development. In this the language newspapers have played no small part. Consequently if a villager receives a language newpaper or even a weekly it has been the source of stimulating interest and providing information on political matters. Until recently very few newspapers had even special columns on farm matters because most language newspapers were directed towards an urban readership. Now that some villages and more towns are beginning to be covered, it will be in the interest of the newspapers to have a page each on farm matters. Most press people are ill-equipped for that. Only a few national newspapers in English have developed this kind of expertise. Perhaps it may eventually be a good investment if language newspapers were to put some money into this device for promoting the farmers' page or column.

Special newpapers for farmers have not yet been attempted nor are they likely to be successful. This is because the farmer while interested in his own problems, associates newspapers with a kind of general information without which it would perhaps lose its importance in his eyes. Newspapers for the neo-literates have, however, some future in villages. *APNA DESH* issued by the Ministry of Information & Broadcasting has met with success. It contains mostly information and has still not enough instructional material. Perhaps a special version could be published for the villages. It seems to me that the neo-literates and school fall-outs in the villages could be an effective inter-personal channel for the printed word information. In some states they could be reached through rural libraries. Most rural libraries grew up during the period of struggle for freedom. Books and magazines in these libraries are mainly those that interest the lower middle class intelligentsia. Not much material

is kept for neo-literates and the school-fall-outs and farmers

* * *

The above analysis confirms the proposition that media are valid for agricultural information to the extent that they are supported by inter-personal devices such as discussion groups, etc., and secondly to the extent that their programmes synchronise with the order of various agricultural operations and the characteristics of various inputs. However, this is not all. To get the best out of media for agricultural information there has to be an inter-media approach. If, for example, farmers have to be persuaded to use balanced fertilisers for the genetic and nutritional value of the plant, the communication of information has to be so arranged that the radio, the film, the printed word, exhibitions, displays, etc, all converge upon this issue at the desired point or points of time. This would make for intensity of impact and quicker assimilation and would also facilitate retention. Very few developing countries have attempted this kind of inter media planning. It calls for team work at various levels both when the initial programme is prepared and when it is put into effect. Of course campaigns have been undertaken from time to time when word has gone down to various media to concentrate on a particular slogan or items such as grow more trees campaign. Campaigns have their value but they do not go deep enough for the recipient to adopt new skills. What I am suggesting therefore is different from campaigns. It is a kind of composite use of media for instructional purposes.

Much work has been done and is being done by Agricultural Information Units both at the Centre and in the States and also by such units in the private sector. Details of the work being done by the Central Farm Information Unit of the Ministry of Agriculture, Government of India, is given in the Appendixes. The inadequacy of these efforts arises not from the fault of those responsible for these units, but from a lack of understanding of the objectives of agricultural information and of the way in which its utilisation should be organised. Reinforcement of media programmes by inter-personal

communication group discussions and a two-way channel of questions by recipients of information and their prompt answers by programme originators is one important factor in the effective use of information media and aids. Another factor is a carefully planned mobilization of different media so that they converge on the specific objective that is the aim at a particular lime. A third factor, and perhaps the most important, is that information and communication should become an ingredient of the production operations, the media men should be members of the same team which has the agronomist, the soil and fertilizer expert, the water-expert, the pesticides specialist, the officer of the credit institution, etc. They have to plan together, implement the entire operations together and review them also together.

6

Mass Media as an Aid to Literacy

According to a report of the Unesco Regional Office for Education in Asia (Literacy and Development) bilateral agricultural extension experts in a Mekong Riparion country, found that although 53% of the farmers had attained a relatively high level of literacy they made no use of printed literature that was supplied no them. Extensive work had to be done orally with the result that the farmers could not remember all the agricultural operations.

The fact is that literacy can play a key role under two conditions. First, a dynamic agricultural situation should be present. Today in certain areas of India such as Punjab, Haryana, Maharashtra, Gujarat, Uttar Pradesh, Bihar, Tamil Nadu and Andhra Pradesh, this factor is growing. The farmer is getting credit-minded because of new technology. Government has decided to extend banking operations into the rural areas. Ready availability of inputs is another development beginning to be noticed throughout the country. Literature for deciphering documents about inputs, credit and the new crop technology, is meaningful to the farmer. More motivations will come with the completion of land reforms a process that has already been initiated.

The second condition is that literacy needs to be supported by other methods. An important collaborator of literacy are the mass media. Mass media and literacy have to function together and have to supplement each other.

Inspite of the fact that there have been several experiments in different parts of the world on the use of radio and TV in imparting literacy, it is widely accepted conclusion that literacy teaching cannot be exclusively done by the radio, TV or film ; reinforcement by inter-personal communication as well as by other kinds of audio-visual

methods and techniques is necessary. The use of mass media like TV, radio and the film for such an educational process as the teaching of the alphabets, sentences, words, arithmetic etc. has certain inherent problems from the point of view of poor countries. TV sets are expensive and are owned by rather well-off middle-class and aristoratic families. Community sets may be provided by government or by other bodies but as has been the experience in Delhi these get far out-numbered by the privately owned TV sets. In 1959, All India Radio introduced TV in Delhi area and installed about 67 teleclubs each of which had a community set. Over 500 sets were also provided to Secondary schools. There was no private TV set at that time. In 1971, the number of privately-owned TV sets was 34,000. Consequently the purely educational programme (these were not literacy programme) or programmes of social value and citizenship training that were started in 1959 receded into the background. Today there are 94 community sets which include also the sets meant for the Krishi Darshan or agricultural programmes. A private TV set owner in Delhi well-off and with some leisure, would usually express his impatience with these programmes. The real reason is that most of these private owners of TV wish to have film programmes and programmes of pure entertainment, not even entertainment of the kind which would carry a message. This Indian experience is confirmed by a report sent to Unesco by one African country where TV sets are owned by comfortably well-off middle-class people who are not interested in the use of TV for literacy to be imparted to the masses.

Another mass media used for functional literacy is the radio. Even though the radio has, according to reports from different countries, proved to be a useful medium for functional literacy, it has in order to be truly effective, invariably to be supplemented by other audio-visual facilities such as film strips and posters. These need to be synchronised with radio programmes. Since the production of audio-visual material is something not within the review or responsibility of the radio broadcasters, coordination becomes a problem. The radio is unable to

give by itself the word or letter formation which is also an important element of literacy teaching along with sentence structures.

Again, let us take the film. The basic problem with most documentary films prepared for educational purposes is that they tend to get out-of-date. The Films Division of India has had this experience more than once. What is more, the 35 mm film or 16 mm film does not lend itself well for instructional purposes particularly for functional literacy and for the imparting of alphabetisation. These films can of course be a good medium for motivational and advance publicity for literacy. What can be useful for instructional purposes, is the super 8 mm films on which only perfunctary research has been done. The super-8 mm film is looked upon with scepticism by the professionals. But, it is the super-8 mm films which has got the mobility, the reach and the specificity that are essential for functional literacy. So far as the general film programmes are concerned commercial distributors and producers have very limited interest in education. In India, they seek to make every film give some sort of a message but this is only an excuse ; the rest of the film is full of all manner of distortions of actual life. Aesthetes in the commercial film world, seem to regard it "infra-dig" to get involved in educational film making. There have been recently some brave efforts but they are more aimed at school children than the adults.

Vocabularies related to vocation, a basic element in functional literacy, and the teaching of structure of sentences and alphabets, are matters which require interpersonal communication or in the alternative self-study contraptions of the modern type. To the latter, mass media like TV and films can make contributions particularly through cassetts and video-tapes, provided the initiative is taken by educationists.

Mass media should be treated as companions and partners and not as substitutes for other educational techniques and methods. What sort of partnership role can be played by mass media? Broadcasting—in particular TV—gets into direct communication with the individual learner and can command his whole nervous system. In

this matter, the researches of Marshall Mcluhan are relevant. By commanding the whole nervous system of the learner the TV teacher, in a way envelops the learner who can almost feel his physical impact. This in the case of TV is undoubtedly a great advantage.

Moreover, both TV and radio and even the film are an important vehicle for reaching people in remote and inaccessible areas. The transistor has undoubtedly, during the last few years, revolutionised the situation. It has enabled developing countries to "multiply" class rooms in the form of groups of learners. The more remote the area the easier it should be to form groups because for them even the transistor radio has the attraction of novelty. By annihilating distance as stated in John Maddison's report to Unesco mass media brings literacy into the homes or at least meeting centres and enables classes to function even without the establishment of regular schools for adults.

In the context of functional literacy, however, an important asset of mass media is that they can impart literacy without withdrawing people from their occupation and work. The farmers can become literate through the radio without even having to leave their villages, provided that whatever is communicated to them is not only authentic but also *local*, *specific* and *timely*. Learning in such a case becomes an aid to a task that is being performed rather than a preparation for it. A preparation means interruption in the task and in an activity that brings income. A good radio programme and particularly a good TV programme need not force such interruption. It is in this sense that work-oriented literacy is best facilitated by commissioning the use of mass media.

There is a great shortage of qualified and trained teachers in poor and developing countries even for schools, to say nothing of those for adults. The methodology of teaching adults or "andragogy" has not even developed. Only a few instructors could be available at least in the beginning. But in countries, where the rate of illiteracy is high among the potentially working group it has an adverse effect upon economy This lends urgency to literacy. Therefore, the use of TV in countries

with large numbers of illiterates could presage revolutionary developments. Groups of learners could gather under the leadership of conveners, monitors or relatively unqualified teachers These conveners could find the programmes useful and sometimes, where even such unqualified teachers or leaders are not available the direct communication of TV itself could by a substitute for the teacher.

In some developing countries, agriculture is being transformed from a subsistence occupation to a scientifically based progressive investment operation. In such a situation, new discoveries relevent to farmers are being made almost month to month. The normal channel of communication through the extension agency is important no doubt, but it is insufficient. The farmer is impatient. It is through the TV and radio and sometimes through the films that the best of the scientists can communicate directly and simultaneously with large bodies of farmers. A national demonstration to with reference has been made elsewhere meant to bring teams of scientist into contact with farmers on their fields. But that too cannot be a substitute for the stimulus which a TV and radio talk can be to a group of eager farmers hearing the voice of the top agricultural scientist concerned with latest research and discoveries. In such a situation if even the three R's. are conveyed through the media, farmers would welcome them.

Information conveyed by mass media programmes cannot be retained for long. In order to retain it the learning of the alphabet is necessary. The farmer getting information on mass media being keen to retain it requires no persuasion to learn the alphabet.

Mass media can be also useful for in-service training of literacy instructors. This is to be done for two categories of persons engaged in imparting literacy to farmers. First professional educators and teachers need to be given lessons in agriculture to enable them to devise ways of imparting functional literacy based upon the latest development in agriculture. Secondly, specialists, such as agronomists, people concerned with banks, people concerned with cattle development and milk development,

suppliers of inputs, marketing societies etc. need to be taught the methods of teaching adult learners belonging to the professions with which they are concerned. Radio T.V., videotapes and super 8 mm. films can be an excellent medium for their instruction, sometimes without taking them away from other jobs.

Mass media can quickly communicate instructions to farmers to enable them to tackle local problems such as pests, heavy floods, uncertain weather etc. The old methods of communication are too slow. Admittedly, this is not literacy in the strict sense. But it is a function that convinces farmers of the uses of literacy. Mass media can be fast purveyers of ideas once they can become functionally useful to people.

Finally, literacy is a life-long process. In the case of functional literacy a farmer or a industrial worker has to keep on learning and knowing new things quite apart from attending any course or completing any given number of lessons. Neo-literates can appear in the TV programmes and through TV and radio programmes they can get the stimulus and an awakening of curiosity along with the skills and tools for assimilation of knowledge throughout their life. The curiosity is based upon the link with the occupation and the tools learnt through literacy lessons.

In this respect, the press and the mass circulating books and journals have a special role to play because the press is not merely a one-way process. In some countries, the press have special columns for the neo-literates. Letters to the editor in the national newspapers are an occasion for the expression of views by the readers. Moreover some of the supplements that are brought out from time to time are intended for specific occupations. It is, therefore, important that in developing countries in particular, some specific supplements or columns should be reserved for the neo-literate adults. It will not do to treat them nonseriously or to try to amuse them as some of the children supplements do. Neo literate adults are men with experience and wisdom. The mass-press would do well to appreciate that their future survival lies in having an access to the neo-literate adults particularly

in a country like India. There are weekly Indian language journals with growing circulations. But even a circulation of two-and-a-half lakhs in a country like India for a Hindi weekly can only be regarded as a first step. For the encouragement of neo-literate adults such journals ought to have special pages for them. This would increase their circulation even though gradually. Mass publication of books such as paperbacks is also important. At present the paper-back book industry is aimed at the urban middle-class and much of the reading material is in the form of novels and short stories based on middle-class situations in towns and cities. And yet, experience is not wanting such as those of publishers of pavement books, of the publication of truly low cost books for villagers. Hitherto these pavement publishers have been publishing largely folk plays, folk stories etc. But other material can also be introduced. The point is that the attitude of making easy money through material that would appeal to the middle-class of the urban areas may have to be modified a bit. It is recognised that in the beginning neo-literates would not be ready purchasers. But the production of such literature will also have to be at low cost. Some research may be needed.

Though practically all mass media have had their education departments with programme planners and producers for a long time, success as instructional media has come to them only when they have planned sufficiently in advance for their specific roles in the instructional process. Instructional use for literacy calls for the following specific roles :

(1) The preparatory role ;

(2) For direct teaching ;

(3) For training of instructors, leaders etc.,

(4) As mass media teams in the multi-media approach so that the media can cooperate with each other as well as other devices and methods ;

(5) As users of new methodology ;

(6) As part of the organisation and administration of a literacy programme.

The uses of radio, TV and the mass circulation press for preparing the minds of people in a society for functional literacy programme can be extremely important. These media provide the motivation through broadcasts and films showing for instance how an illiterate farmer is handicapped for want of literacy in the process of obtaining loans; how he is deprived of his legitimate due in the market for that very reason and how it is difficult for him to remember the various stages of improved agricultural practices in modern technological agriculture. These could be feature programmes or short-feature films like the advertisment "quickies". In Burma and in Kenya this has been attempted though not for farmers as such. For instance, in Kenya* a series of 13 TV broadcasts were used for launching national literacy campaign in English and Swahili and time was provided for TV interviews with guest speakers from the Adult Education Department. Strangely enough, neither the radio nor the TV, nor even the film, in India have been used for motivation in this way. Campaigns for family planning, for small savings, for cleanliness and for other publicity such as grow more trees have often depended on the media. But they have not been used specifically for such preparatory motivation for launching any literacy programme. Even the Literacy Day gets somewhat perfunctarily noticed by the media. For functional literacy for farmers such a promotional programme for high-yielding varieties was not necessary in India because the motivation had been generated by scientists' demonstrations. It is the prior existence of this motivation which urged farmers towards farmers' training as such. But for functional literacy for the small farmer the media need to be exploited very specifically by showing the problems of an illiterate small farmer in a situation of dynamic agricultural progress.

In Yugoslavia, TV gave a new direction to motivational campaign. Illiterates and the difficulties that they

* This example, as well as some others from various countries participating in Unesco's Functional Literacy Projects, is from John Madison's report, Unesco, 1971.

face were introduced as a topic of general conversation among the public and were taken up on the radio and in the press and at meetings of the Republican Assembly. In other words, the media have been effective for creating an environment in favour of functional literacy among the general public. This is an additional use at the preparatory and the sustaining phases of a functional literacy programme.

There is another kind of promotional use also of the media. In Tunisia the national press prints in Arabic texts of broadcasts. Everyday the TV critic of the national French daily regularly features the literacy programmes in its columns. In Algeria lessons are published in the press fifteen days in advance in the form of a brochure supplement covering 8 TV programmes at a time.

How far has direct teaching of functional literacy to adults been effective in the new experiments that have been conducted in 40 countries that reported to Unesco ? One of the smaller problems in direct teaching through mass media is that as mass media they address themselves to large audiences which however consist of diverse elements, that is to say, people in diverse occupations. Therefore, the programme of familiarising them with functional literacy cannot be a uniform type of programme. This was the experience of Senegal where a major problem encountered was the absence of a common denominator of functional instructions. After the first series of radio programmes it was discontinued in order to explore a more diversified format. Tunisia, however, has had a relatively more successful programme in which it has combined radio and TV with the textbooks for learners. Since 1967 the Tunisian project has gone through three stages and the number of students rose to 25,000 in 1969. Programmes are broadcast both on TV and the radio but the TV lessons are published everyday in Arabic in newspapers. Books are issued for those following the courses and are on sale at newstands. The three volumes published are about reading. writing and arithmatic and 150,000 copies of these have been issued. This is a specifically literacy programme as distinguished from

daily broadcasts for rural audience. A similar experience has been gained in U.A.R., but with one difference, namely, that no supplementary printed material is used and teaching method is based upon verbal descriptions of Arabic characters. The department of education keeps records of more than 5,000 listeners, participating in the radio course. To check the progress and effectiveness a special course is given to 30 to 50 learners at the radio station itself, in a class. The lessons are of not more than 50 minutes duration each and are broadcast six times a week. A course of 90 half-hour literacy lessons was begun on T.V., in November, 1968. Each lesson was transmitted three times weekly. Before this programme began, two pilot experiments with TV literacy courses were conducted in 1963-64 and 1964 65 and were also evaluated. Some reading material related to T.V. programmes is also issued for follow-up lessons. There were 350 viewing centres in 1968-69. Each viewing centre was under a monitor. The total number of learners that have benefitted from these TV courses was 10,500. Zambia has a different style of programme. It runs 80 literacy classes in different parts of the country for which it broadcasts on the radio programmes in order to teach them the Bambi languages of the Copper-belt provinces. In other words, it is a programme of teaching an additional language and through regular classes.

Guatemala has an interesting experiment of literacy programmes from a central radio station. The interest lies in the fact that though it is a two-hour programme daily mainly for literacy, it has short breaks for music and for items like agriculture, health etc. This kind of literacy course mixed with other courses lasts six months. Moreover, every morning at 6 o'clock there are special broadcasts on agriculture and health themes. These are directed both towards individual listeners and towards the "Rodiophonic" schools that meet in small groups of about 12 pupils each with a monitor. This programme is similar to the radio farm forums that India had started back in 1956 in 145 villages near Poona*. Jamaica started

*"An Indian Experiment in Radio Farm Forum"—J.C. Mathur and Paul Neurath, Unesco, Paris,

with closed circuit broadcasts and literacy sections, both on radio and TV with 211 students and 12 classes, six using TV, five radio and one a taperecorder. A year later literacy broadcasts were started on the open circuit. The interesting thing about Jamaica's experience is that both commercial and non-commercial systems are participating in the educational TV programme. Jamaica has also set up mainly in the rural areas what are called "media classes". These media classes listen to radio and TV programmes of less than half-an-hour duration each broadcast twice a week. The classes are held for 90 minutes so that there can be discussions later on.

Mexico has been using radio and TV for direct group teaching of literacy. The name of the course is "I can do it". At first they started with experiments on listener groups on the basis of a textbook and workbook. Then the lessons were recorded on film, tape or video-tape. Commercial broadcasting companies allowed use of their studies free of charge. The course comprises 90 kinescopes or video-tapes and 114 radio tapes. Each course lasts about six months and each broadcast lesson usually lasts 27 minutes. Government supplies free of cost textbooks of which for each course 500,000 copies have been issued.

Mexico has also been active in using its 150 radio stations for literacy courses. Lessons are broadcast early morning or in the afternoon. However, a private organisation in Mexico needs to be mentioned. It is called E.R.H. It covers nine States with a population of 8 millions. The radio courses are designed for instruction in literacy, arithmetic, social studies. Community sets are provided for learners at four different levels. There is a set at each of the 85 radio centres in rural areas or very small towns under the supervision of one to three monitors. Currently there are some 1200 registered learners of whom 300 have reached the 4th or highest grade.

This is a somewhat expensive arrangement because obviously the monitors are fully paid. This programme of direct teaching calls for considerable pilot experimentation and investment in Mexico. United States has two examples

worthy of mention. One of these is for Mexican Indians or Red Indians who know Spanish but not English. This is an additional language programme like that in Zambia and is wholly financed by Government with the help of the University of Arizona. The second US Programme worthy of mention is "Operation Alphabet". It has TV literacy series of 100 half-hour video-taped programmes developed by the Philadelphia Public School Adult Education Programme and later distributed on a nation wide scale by the National Association for Public Schools and Adult Education. Started in 1961, it had by 1964 covered 100 cities. This programme seems to be directed towards illiterate Negroes in particular.

Brazil has experimented with radiophonic schools of the Guatemala type. They are called 'tele schools' in the case of TV programmes. The network of TV to which they are attached utilise 36 TV programmes which are supported by a students handbook. There is a private foundation also in Brazil called Feplam which too has established a network of TV schools. Equador has an interesting programme operated by a very small station with 500 watt transmittor directed towards 'schools' of 30 pupils each. But a more interesting programme is in Columbia where broadcasting for literacy is mainly carried on by two different organisations. One is directly under the government and the other is directly under the Radio Sutatenza. The government programme is aimed at the adults living in the slums in the principal cities and the courses consist of 150 hourly programmes divided into units of 10 minutes each. There are four units, one each for reading, writing, civics and religious education. In between, there are five minutes musical or recreational breaks. The Radio Sutatenza programme is aimed at the agricultural community of the high plateau of the Andes which originally began under the religious auspices and still has the blessings of the Pope. The organisation which runs this radio has two training teams of young men and women at field work. It also issues a magazine with an annual distribution of 3 to 5 million copies. Radio broadcast consists of 19 hours of programmes daily mostly on general information. Out of this, half-an-hour is given

to literacy teaching for adults. This is repeated several times in the course of the week so that those who missed once can get opportunities again. In Peru, there is a programme called Tepa run again by Catholic Priests. It uses both radio and TV. It is a one hour programme daily and aims at enabling the adult to cover the first four courses of elementary school education.

Among the Asian countries India has not used either the radio or TV or the film for literacy purposes. Iran also is using radio mainly for a supporting programme for the functional literacy and training projects of Unesco.

The Italian Telescula is not a programme of functional literacy. It is a programme of using TV for mass literacy aimed both at adults and school fall-outs. It is one of the most successful programmes of the world and it has enabled the TV to be integrated into the national literacy campaign and to be used in the educational infra-structure. There are two types of courses, one for literates and the other for semi-literates. Each of these six-monthly courses comprises sixty lessons composed of three half an-hour evening transmissions weekly which form the central focus of two hours of class teaching. In other words, broadcast and class teaching were dovetailed into each other. Between 20,000 to 30,000 students a year followed the course, the maximum in later years being as much as 55,000 annually. The programme fulfilled a felt-need at a time when Italy was fast industrialising particularly Northern Italy and there was urgent need for literate workers. Through Telescula, a young worker still at the factory, could improve his proficiency. Also it saved the State the necessity of opening a large number of schools. The main objective was industrialisation. The situation seems to be similar in India today with the difference that the main objective could be agricultural progress.

In Yugoslavia a literacy programme is broadcast in Serbo-Croat and is called "ABC by TV". This is followed by one course of mathematics, one on history, another on conjugal consultations. Because this programme has to compete for attention of the viewer against the entertainment programmes it is not devised like the Telescula programme on the class room pattern but carries the

dramatised story of an illiterate country woman who overcomes the difficulties of living in city by learning to read and write. According to the report 500,000 people regularly follow the ABC by TV programme and 200,000 regularly follow the mathematics programme.

This then is the story of the use of the media both for mass literacy as in Italy and for functional literacy as in several other countries. It will be seen that in every case the motivation has come from the need of economic development.

In some countries the media have also been used for the training of literacy instructors for adults. This is so in U.S.A., Brazil, Colombia and Iran. The Iranian experiment is related to the functional literacy project.

The multi-media approach calls for synchronised production of programmes in which the film, the radio, the TV, the gramaphone records and videotapes, posters and film strips can be used for functional literacy related to specific functional operations. In Iran posters have been used to support radio programmes In a general way this is done in India also. But the fact is that it is seldom that the production of items by these media is done by getting together teams of specialists, teachers, broadcasters and evaluators. Teachers and broadcasters are according to Unesco reports often got together and formed into teams but experts such as agronomists, suppliers of inputs and scientists need to be even more directly involved in team-programming.

A more detailed discussion of the implications of the multi-media approach is given in the chapter on information and communication. The roles of media for literacy concerning methods and administration and organization have been examined in the chapters on methodology and on the growth of farmers' education, respectively. It needs to be reiterated here that for the effective use of mass media for such a specific purpose as literacy-teaching, careful planning, distribution of responsibilities, synchronization of the production of material and frequent consultations among the concerned

agencies will have to be assured. The attempts in various countries so far, to use media for literacy teaching have been for too short a period, and over areas with too small a population to justify firm and positive conclusions. The indications are favourable, but more experience in larger countries will have to be gained.

7

Trainers and Their Training

In farmers' education the question of who the trainers or instructors should be has assumed a new importance during the last few years. In a recent address, the Vice-Chancellor of Uttar Pradesh Agricultural University observed that the concept of a single, multi-purpose village level worker, evolved about two decades back, was quite appropriate for a simple and a large-scale agricultural extension programme meant for simple farmers concerned with simply evolved needs in agricultural and non-agricultural fields peculiar to that period. The situation after 1966 had changed dramatically so that the village level worker of the old type appears to have become out of date to act as the trainer for the farmer engaged in the new developments. His technical competence is at too low a level to accept the message of scientific agriculture and up-to-date modern know-how. Of course, there are other problems too such as the unmanageable area of operation and his being responsible for a number of non-agricultural functions which he cannot avoid, being practically the sole representative of Government in the village. Modern agriculture has become very complex and is changing fast. Therefore it seems necessary to think not only of the village level worker of a higher technical competence but also of one who can apply himself largely to agriculture and is relieved of non-agricultural functions.

Agricultural development calls for what is now known as the systems analysis, that is to say, an analysis of inter- relationships affecting agricultural development in a specific area. The items involved in these inter-relationships may be, among other things, crops, inputs, credit, water and the capacity to take risks. In other words, all those people who are concerned with these different elements are concerned directly, as much as the trainers

and the village level extension workers could be. The Vice-Chancellor of the Agricultural University has proposed that the graduates of agricultural universities should be sent out as trainers. This is a valid solution if it could operate in all villages and in all the States. But a problem is that university graduates are not usually concerned directly with inputs, far less with credit and the supply of water. Therefore, one would be perhaps justified in assuming that what farmers' adult education needs now is not one category of instructors but a number of persons concerned with different aspects of the system of agriculture in a particular area. These persons should in respect of those particular aspects give the demonstrations, use persuasion and provide the clarifications that could move farmers to take to new ways. Usually the average farmer waits for an innovation to be attempted by a person of position and economic means who can take the risk. In quite a few villages it is the caste leaders and better-off farmers who can undertake these risks. In the light of their experience the small holders could follow. Can this type of traditional caste leaders still function as a trainer? I understand that use has been made of such a situation for spreading new ideas in villages in certain parts of Mexico. It is undoubtedly true that in those Indian villages, where the community is still intact (such as in tribal areas) under the leadership of a better-off caste leader, his example can be followed. But in the non-tribal areas, caste leaders and better-off farmers are often unwilling to impart to the smaller holders the results of their experience and of the risks they have undertaken. On the other hand, some of them might even discredit them. The example could be followed provided smaller farmers are organised into small compact units and are secured against risks involved in undertaking experiments. Otherwise the situation would grow into a crisis. The moment the smaller farmer attempts new techniques and begins to give more time to his own cultivation, shortage of labour for bigger and better-off farmers and consequential rise in wages would follow. The latter would grow hostile. In some districts, the bigger farmers tried to import labour from outside which led to clashes between the imported

labour and the labour traditionally employed from amongst the local small farmers.

This being the situation, what is otherwise sociologically valid, that is, the leadership of the better-off farmers in the adoption of new practices, may not necessarily prove effective. What has probably been attempted in certain other parts of the world is to use these leaders as agents for the distribution of inputs, supply of water and machinery and in marketing so that they can charge smaller farmers for these services and be interested in their progress. Such interest in the use of improved practices by tenants was perceptible where the share-cropping system was prevalent. Share-cropping implied that the greater the investment in inputs by the smaller farmers, the higher would be the share of the bigger farmer in the yield. In certain IADP villages in the Raipur District of Madhya Pradesh, the role of the more progressive and better-off farmers in promoting the adoption of improved practices by small farmers has been noticed under what is known as the "whole village approach". When objections and problems were brought up at joint meetings, they were often answered by other *villagers* and not invariably by the extension staff ; though a good village level worker was the key man in the process, the total community action inspired confidence and participation through a sense of risk-sharing. In fact, some farm leaders went to the extent of helping small farmers with loans and with assurances against failure.

It seems, however, that this attitude of better-off farmers depends upon the availability of an enterprising village level worker who could involve the better-off farmers and caste leaders in the process of helping the smaller farmers. Better-off farmers would not automatically be drawn into the process unless the government-sponsored extension agent is a person with expertise, higher than average qualifications and capability for organisation.

The Raipur experiment is recent. In most other villages, the Panchayat elections as well as elections to other bodies have generally caused the progressive and better-off farmers, particularly from the higher castes, to

divert the attention of small farmers into political channels on the basis not of economic issues but of traditional caste-divisions. Prima facie, it should have been natural for them to win and retain the goodwill of smaller peasants by encouraging and helping them to take to modern technology in farming. On that basis they could have hoped to command their votes. But that is, apparently, too slow and pains taking a method of wielding political influence when the easier,—traditional appeal to caste-loyalties brings forth quicker responses.

There is, therefore, a serious limitation to the traditional caste leaders acting as trainers of farmers. Who then can replace them ?

From time to time proposals have been made to organise brigades of teachers of primary and middle schools in the villages as adult educators of farmers. In this context, it has been suggested that school masters in Indian villages should make use of the land in the compound of the schools. Their farms would draw the notice of the parents of their pupils. But the land that is usually attached to a primary or middle school is hardly sufficient for kitchen gardening. Where the local community can give sufficient land to the school for a regular farm, an additional advantage would be that the income from the school farm could meet much of the running expenditure of the school. The farm would be the laboratory for adult learners.

But a prior requisite is to have a proper training programme for school teachers, without which they cannot be effective leaders for adult farmers. This training programme of teachers could be the responsibility of agricultural universities should they wish to extend their influence without having to share the burden that the extent of influence might necessitate. Courses could be arranged during the vocation when dormitaries are available. Since the exposure of the primary and middle school teachers to the environments of agricultural universities would be for short periods they would need to be kept informed during the rest of the year through correspon-

dence, bulletins, brochures and replies to questions to be answered by university departments.

Such a training programme for the school master would also require the cooperation of District Agricultural Officers, District Education Officers and officers in the Education and Agriculture Departments of the State Governments. The university should organise the programmes for school masters within the knowledge of these functionaries so that when the teachers return, they receive the necessary cooperation. An evaluation of a training programme for Gram Sahayaks (including some teachers) by a University showed that the Gram Sahayaks selected for training should be self-engaged in farming, should be progressive and receptive, interested in higher training in agriculture, should be literate, mature in age but not old, may have some resources and should if possible be socially influential. These qualities can to some extent be shared by school masters and similar village functionaries.

There is a serious drawback also with the average schoolmaster which has been noticed in some projects. For example in the Poona Project (1956) of All India Radio in which 145 radio Farm Forums were set up around Radio sets, and in which the post-broadcast discussions of the Forums were the principal medium of education for adult farmers, it was noticed that if a schoolmaster functioned as the convener of a Forum, he tended to treat the farmers' forum as a class ; instead of encouraging discussions, he would put questions to them as though they were young pupils and thus inhibited free expression. And since the schoolmaster not being himself a progressive farmer is not generally treated as an equal, the situation was anomalous. His "superior" knowledge was based not so much on his understanding of the farmers' problems as upon his skill of reading and writing. Even if he happens to be also a farmer, he is not conversant with the psychology of an adult learner. On the contrary, he is, by force of habit, inclined to be academic and to make of the group a channel for one-way communication. It should, however, be possible to include in the training of schoolmasters of Agricultural Universities, a course in

adult psychology and the teaching methods for adults or androgogics.

Does the school have the right environment for a training centre for adult farmers? The idea of community school is gaining favour. The school walls are being shed to make it a place of learning for both young people and those in the thick of adult life. To some extent schools that are made farmers' education centres would draw closer to the problems of life and it is to be hoped that the hiatus between academic learning, and rural life—so widespread among today's schools—would narrow down. The schoolmaster will also gain in stature being concerned with the management of a farm similar to that of other farms but with new facilities and techniques. Still the environments of an elementary or even middle school may be too juvenile to permit its integration with serious work of the community. A high school or a college may be more appropriate for a Farmers' Training Centre, with a laboratory ; for, at that stage, vocational bias would be desirable for institutional education.

Previous attempts in India to transform educational institutions into community centres have not succeeded for two reasons. Administratively, general educational institutions have been linked to Education Ministry and departments. These have no concern in or awareness of agricultural production programmes. Officers of these departments are also not moved by the idea of higher production. They measure their achievement according to the number of pupils who pass the final examination. Adult Education in most developing countries has been for long an appendage of school education so that in most reports one comes across references to the courses completed by adult students, the number of classes run, the number of students who passed the tests for particular courses and the certificates given to them. The measurement is *not* of the higher production achieved by the adult learners on their fields as a result of their learning improved techniques and methods for using inputs and knowing how to read instructions and write their accounts and cultivation plans *i.e.* functional literacy. Even if a particular educational institution includes any

of these things in the reading material, it is not 'actual' but an imaginary farm, information about which is included in the Primer or Reader.

How can this drawback of the school as a training centre be overcome ? Only if such schools are put under the joint direction of both the Directorates of Education and of Agriculture. If the school teacher is to be the trainer or instructor of adult farmers then he should receive directions both from the agricultural officers and educational officers of government. He should adjust his instructional programme and the reading and audio-visual material to the needs and time-table of the specific production programmes of the individual farms. He should be aware of the inputs received. It is obvious that he cannot do all this unless administratively he is under a joint mechanism, and in drawing up his plan of work receives joint guidelines from educational and agricultural experts.

But as stated earlier in this Chapter, the training of adult farmers has to be related to inputs. If those who supply inputs like fertilisers, pesticides and seeds are not involved in the process of demonstration and training, an effective agency for training is lost. Commercial firms producing these commodities are well aware of the importance of training. Some of them were pioneers in laying out demonstrations. So far, however, their impact has been marginal. In analysing the causes of the inadequacy of their efforts one can come upon the directions in which their potential as trainers of farmers lies.

A characteristic of an economically developing society is that manufacturers and industrialists tend to look for immediate profits from limited output, rather than long-term returns from initially heavy but assured investments. Training of consumers in the proper use of commodities is a long-term investment for any plant. Manufacturers of fertilizers usually begin with a 'seeding' programme in which they seek to acquaint farms with their brand of chemical fertilizers. Demonstration plots are laid out in farmers' fields and in the beginning farmers are given fertilizers at concessional rates or even free of cost. Recent experience has shown that it is possible to draw excellent results

initially with abundant use of nitrogenous fertilizers without bothering about such "refinements" as the complementary dosages of phosphates and potash, or the deficiency of micro-nutrients and without diverting into such further developments as multiple cropping or a deft use of the slopes of furrows for sowing and irrigation. But a time comes when these refinements become basic and the unprepared farmer faces problems generated by unbalanced use of only nitrogenous fertilizers. A supplier of inputs can be an effective trainer if he does not confine his demonstration and instruction to his commodity only but covers all connected aspects without which optimum results from any single input would not be possible. Moreover, the trainer should have the back-support of a research unit on field problems. One way of providing such facilities would be to have joint undertaking of training and demonstrations by several distributors of inputs. Ideally, teaming together of the suppliers of tubewells and pumps, of the important fertilizers (N.P.K.) of pesticides and sprayers and of improved machinery in a selected area with a credit agency would provide an excellent opportunity for complete and balanced training. Fragmentary demonstrations, as at present, by promoters of fertilizers are of marginal value only.

Lately nationalised banks have been coming into contact with farmers increasingly, offering them credit under various new schemes. The National Commission on Agriculture has in one of its preliminary reports strongly urged a dynamic programme of credit to small farmers by banks. The emphasis is quite appropriate. But the problem is that the personnel employed by the banks in the rural areas has had hardly any training either in the process of communication with adult villagers or in that of assessing the needs of agriculturists. Papers and forms required to be filled by banks are so elaborate and complex that for their interpretation the farmer need a middleman. I happened to be present at the time of the inauguration of a bank in an agricultural community. I was told the following day that lawyers had entered the field and that without them the prospective loanees could not understand the complex forms.

Why shouldn't the banks' own personnel be interpreters, trainers and instructors of farmers ? The banks have serious and obvious stake in proper use of the loaned amounts. One of the challenges that the new, ambitious programme of government for small and marginal farmers has to face is the utilisation of the credit provided to them on special terms. For the success of such schemes of supervised credit, the credit-giving agencies *i.e.* the banks have to give guidelines to their staff to enable them to function as co-instructors along with extension workers.

Since farmers' education in a large rural country like India needs a large number of animators or local constructive group-leaders, one source that needs to be explored is the ex-servicemen or the former jawans and non-commissioned officers. Usually, they are discharged at an early age well before they are 50. They have organised personalities, a broader vision and are active. Above all they are practically all drawn from the rural areas and go back to families and environments to which they belong. It is said that gradually they lose the capacity for active organised work, and get lost in the surrounding environment of casteism, family and land feuds. Some of them seek escape in recalling memories of their life in the regiment and of the front.

It does appear a great pity that we are continuously losing such vast potential for organized constructive activities in farming. Whose is the fault ?

It is true that mostly they suffer from one handicap. The contrast between the environment of the regiment or of armed forces units in which order and obedience, smartness, and orderliness prevail and, on the other, the disorderliness, struggle to earn through more production, expensive and tragic customs such as dowry and death feasts, is so great that the discharged soldier and non-commissioned officer soon gets exasperated. His own training and education in the armed forces seem to him to be irrelevant in such a situation. Soon he gets either frustrated or reconciled. In either case the village fails to get a leader for constructive activity or organisation.

Here is an untapped source of group-leaders for

farmers' education. But in order to exploit this source certain steps need to be taken for their reorientation possibly a few months *before* discharge from the armed forces. In fact the process has to begin much earlier, since the soldier does, in the course of his service, visit his village from time to time. These visits are given to repair of houses, marriages and special family organisations. But these can also be the occasion for the jawans to be harbingers of latest information about new agriculture—a profession in which their families are engaged and one to which afterwards they would return on retirement. In other words, during peace-time an active soldier's programme should include occasional exposure to demonstrations of improved agriculture, talks by visiting agricultural scientists, visits to agricultural centres and the showing of selected instructional and motivational films about agriculture. In this way it would be possible to stimulate among the jawans while they are still in the forces the vision of progressive agriculture even in backward villages, to put them in a frame of mind in which, on retirement, they feel like organising groups under their leadership for improved farming activities.

When the time approaches for retirement, the administration would do well to arrange an orientation course of jawans and non-commissioned officers on the verge of retirement. This orientation will have two aims. First, every such jawan's personal and village data will have to be prepared: to what land he would be returning, what the requirements are for making it potential for multiple and high-yielding or other improved types of farming, what subsidiary farming occupations can be undertaken by him to improve his income, what kinds of contacts with input-sources he needs to establish, what are the water and land conditions of his village etc. In fact during the orientation period he can be helped to prepare his own farm-plan under the guidance of experts with practical experience of national demonstrations.

That will be an individual exercise for personal benefit. But along side of that, the group of retiring soldiers will also be collectively given an orientation in village-society with which their contacts during service-time have had to be

only brief and at long intervals. They should be mentally prepared to re-enter a narrow society which, however, has a future to be worked for. This should be not so much a process of disillusionment nor of creating new illusions. It should be a scientific process, embracing the social psychology of farmers, economics of traditional and modern-farming, the potential of even small holdings, the problems to be encountered in a comparatively disorganised society of equals that does not know the sequence of orders and obedience and the regimentation to which the soliders are used. Finally, the orientation course would include, more specifically, training of the retiring jawans as future group-leaders, animators, instructors of other farmers. To be successful in this role they will have to be willing not to impose regimentation of any kind, to be colleagues rather then 'bosses', to be systematic without being inconsiderate towards the adult keen to learn new things but scared of being subjected to the severity of drilling. In other words, they will have to acquire an understanding of adult psychology as a learning tool.

Not that all would succeed or be willing to take up the role of group-leaders or animators in farmers' training. But with the two-fold orientation suggested above it would be possible for many to blend self-interest with training to others and look upon overall agricultural development of their village as a welcome task for their still active energies.

But in this case more than even in the case of trainers drawn from among professional traders, agronomists, suppliers of inputs, rural bankers, agricultural engineers, etc., coordinated and sometimes synchronized involvement of high level personnel from different ministries and organisations both military and civil would give to the Indian villager the new type of farm-trainers from an untapped source. If we wish to widen the spectrum of education, we have to integrate the resources for re-training the educators.

The principal governmental agency for farmers' education is the extension organisation. The Directorate of Extension at the Centre, originally set up to provide communication material as well as guidelines on policies

and programmes, is now a service unit for all divisions in the Ministry for supporting their extension programmes particularly for schemes financed by the centre. At the State headquarters, there are farm information units to produce audio-visual material. But operationally, the apex of the extension organisation is at the district headquarters with District Agricultural Officer, Livestock Officer and others at the head of extension personnel in the various disciplines. The coordinator for the extension personnel is the Collector (*i.e.*, District Officer) of the district (or Deputy Commissioner) assisted by a District Development Officer. He is a generalist administrative officer.

I have often heard advice from foreign experts that Indian agricultural development would gain by having vertical, hierarchical authority at the specialists level from the State headquarters down to the district level and further below. According to them, this would rid the specialist officers of the control of the district collector, and might enable them to function more effectively and more quickly.

But the recent development processes in most States have shown that it is not simple to reconcile the single line of responsibility with the concept of joint responsibility and team work that is so essential at the district level. Even some specialist or technical departments at the district headquarters or supervisory officers at the divisional level are inclined to draw separate and independent single channel for decision making and communication so that team work and joint decisions at lower levels are sometimes upset leading to tension. Consequently, some technical departments at State headquarters and their divisional officers are often reluctant to trust their own subordinates at lower levels with powers.

In fact, they sometimes feel more confident in delegating powers of government to district officers and SDOs in preference to their own officers. Odd as this may appear, it is a pragmatic choice. In a transitional period the more complex tools of human relations are entrusted to those who are used to handling them. Despite the Collector's authoritative ways, he is often able to treat a subordinate of another department less bureaucratically than the

officers of the technical departments. At least he should do so, and if he does not, he is bound to lose his role as the composite representative of all the departments.

Two contradictory trends have appeared on the horizon of this fluid situation. On the one hand all kinds of rural development measures of government are getting condensed into a single though large mass of multi-hued cloud. The villager understands it. But the capacity of District and sub-Divisional officers to keep the condensation from precipitation is not unlimited. On the other hand, on the level of Union and State Governments, impatience to show expeditious implementation in the field is leading individual departments to seek shorter cuts and some feel that the short cut lies in disintegrating this cloud. At one time Community Development was thought to lose pace because of its association with the rest of government departments. In fact in the pilot project stage the feeling of "we" (meaning the extension workers) and "they" (meaning officers of other departments) was clearly in evidence. Later Albert Mayers was realistic enough to admit that the problem of the importance of the project workers in certain executive matters is an important and difficult problem. The relevance of co-ordination and involvement of all field departments in community development was recognised. Lately Agriculture departments in some States have had the feeling that food production could increase if down to the village level there was a separate hierarchy of agriculture officers, no longer dependent on the community development centre. John F. Lews calls this tendency "functional fragmentation".

In actual practice, however, the Intensive Agricultural District Programme or, as it is popularly called, "Package Programme" of the Agricultural Ministry, has worked within the setting of the community development organisation even though evaluation reports of IADP often lament the inadequate professional equipment of the extension service agency.

What could be the role of Collector of districts in extension and training mechanism?

First, the Collector has to be a link, nay, an integrating agent between land reform measures and schemes of agricultural production. The two may have to be undertaken simultaneously. I am thinking of (*a*) specific elements of land reforms being introduced as components of specific agricultural schemes *e.g.* consolidation of holdings as part of a water-management scheme in a command area, or settlement of the ownership of a pasture in a sheep-development or cattle-breeding scheme, or the clarification of the record of rights—*fardabpashi* records-in an area of small-scale surface irrigation schemes, (*b*) elements of agricultural production being made part of specific land-reform measures; for example, whenever distribution of surplus land is to be taken up in an area, provision for the infra-structure such as water, land-levelling, roads, etc., and current inputs such as credit, fertilisers, seeds, etc., should be built into the land-distribution measures. Consolidation of holding would also offer such an opportunity.

My second emphasis would be on the integrated mobilization of different elements of agricultural and allied activities and resources in a selected area. A Collector could try to bring these diverse elements to converge upon a specific and manageable area, even upon individual farmers. Such opportunities are now arising in the form of Agricultural Refinance Corporation schemes based on intensive ground-water development or intensive cattle-cum-poultry-cum-piggery development or dry land farming blocks or small farmers schemes. There is a large variety to choose from or to invent. The essential thing is that it is a *project approach* rather than an all-district development. Every district (and indeed part of district) has its specific growth potential. There is, what may be called a 'basic theme' for the agricultural development of a district or part of district. This 'basic theme' (it may be soil conservation, or minor irrigation, tube-wells, milk production, etc.) provides the nucleus around which a project can be worked out. The involvement of the other production requisites and inputs is the kind of exercise in coordination to undertake which a Collector is specially fitted.

Thirdly, a Collector could have a very active and even effective role to play in the expanding horizons of agricultural credit. Thanks to Agricultural Refinance and Agricultural Finance Corporations, and Commercial Banks, the whole picture is changing and the Collector need no longer be the distributor of loans or taccavis or doles. That task should be of the agencies. But his interest and involvement will make all the difference to area credit operations of all kinds—planning of schemes, problems of securities, problems of realisations, etc.

Fourthly, a Collector's special interest has to be the supply and use of water for the irrigation of crops. I have deliberately put the word "use" because the need is not merely for more water but also for appropriate drainage, for proper levelling of the land, for field channels and the prevention of wastage of water and, of course, recovery from the beneficiaries. Drainage is indeed a generally neglected matter but the new crops do not give optimum results without good drainage. Water management is a new and rather sophisticated field for which a number of pilot projects have been introduced in different parts of India. Water availability covers also supplementary water and, therefore, digging of tubewells sometimes even in canal areas has an assumed priority.

Fifthly, the infra-structure of marketing (including market roads) should command his special attention, because so many government agencies and legislations are involved, P.W.D. corporations, marketing and supplies, apart from trade and banks.

Indeed, I have often wondered why the development of marketing and roads and small market towns (or large rural-cum-urban centres) was not given an important position in the community development programme in the past. This is an item that should constitute the basic skeleton of a district or area development plan. It has now assumed great urgency in those districts where higher agricultural productions would face an environments of disincentive for want of an adequate market-structure (both availibility of inputs for production and sale of agricultural commodities).

Finally, Collectors have in my opinion a special responsibility in mobilising people's participation and co-ordinating farmers' training. People's participation is a comprehensive term and would embrace such distinct and diverse factors as (*i*) the active response of the primary producer (the farmer, the fisherman, the cattle-breeder, etc.), and (*ii*) the activization of non-official leadership at the village, block and district levels. Farmers' training is concerned with the first factor. It has to be production centred which means that in every scheme or project for agricultural development in a district or block, there should be a component of training. Training of farmers includes the laying out of demonstrations on farmers' fields by scientists, arranging camps or "field-days" at these points of demonstration, provision of audio-visual communications synchronised with the various operational processes of development, formation of Farmers' Groups (about 20 members each) in a project area, organising functional literacy for the illiterate farmers. Such training should be organised for participants in specific schemes (*e.g.* High-Yielding Varieties Programme, or Command Area Development or Intensive Cattle Development Schemes) rather than farmers in general in the whole districts. It will be seen that this kind of training requires coordinated and well-timed action by various agencies of the State Governments, Union Government, credit-giving bodies, Panchayati Raj bodies, educational and research institutions, etc. It is an obvious challange for the Collector's role as a coordinator, for perhaps more than any other functionary he should be able to appreciate the position of the beneficiary on whom the various elements of the programme would converge—the farmer.

The above consideration of various kinds of possible instructors for farmers' adult education would seem to show that it is necessary for the instructor to function in one of the two positions. Either he could operate under a coordinator of a programme for agricultural development which also calls for the training of farmers ; or he should be concerned with specific multipurpose development programme in a chosen area started as a production-cum-training programme, as has happened

in the case of a number of functional literacy projects started with Unesco's assistance in countries like Iran, Ethiopia, etc. In these the responsibility for development or higher production is also that of the educational authority. In the usual district or block programme, the responsibility to organise high production falls on the Agriculture Department, while the educational aspect is the concern of the Education Department. The coordinator is the District Officer known variously as Collector or District Magistrate, or Deputy Commissioner or District or county agent.

It would be ideal to have production-cum-training programmes in which the provision for training is an essential element right from the beginning. In large-scale agricultural development programmes such as the High-Yielding Programme, or the I.A.D.P., the element of training came later and therefore the trainer has had to prove his usefulness to the main programme. However, in specific development programmes such as those for dry farming, for newly irrigated areas, for areas brought from the massive programme of milk production in the four or five major cities of India, training is now increasingly being accepted as an essential element.

What kind of training do the extension officers at the block and district level require to facilitate adult education for farmers ? Who are the extension officers in a typical Indian district ? The Village Level Worker has been regarded as the principal figure who moves among villagers, gives information to them, gets them together to listen to a visiting specialist, helps in preparing village level plans and makes lists of participants for new schemes of government. There have been several studies of the effectiveness of the Village Level Worker (there is one Village Level Worker for every 10 to 20 villagers) as a medium for carrying new ideas to villagers. Until the coming of transistorized radio sets the Village Level Worker was an important source of information in many villages. But apart from the transistor radio, three factors appear to have operated as an impediment to the Village Level Worker. First, the new complex technology of the high-yielding seeds took the Village Level Worker in

India unawares and established the inadequacy of his training in agriculture. Secondly, the Village Level Worker is answerable to his superiors who do not belong to the village. The acceptability of an opinion leader in an Indian rural society depends upon such opinion leader being an "integral part of the village social structure and yet to be personally higher in social status and authority." According to Lalit K. Sen's study (Opinion Leadership in India—National Institute of Community Development, Hyderabad, 1969), "advice is sought from people who belong to the same system but are legitimized and sanctioned by custom to be different from those who seek advice". The Village Level Worker being an official does not belong to the same system. He has to show results to his superiors, to send returns and to reach targets. In cases in which the Village Level Worker became truly a part of the community, he was more effective. But the system as adopted under the Community Development makes the Village Level Worker look to the official hierarchy rather than to look around himself truly as a local man. Thirdly, the Village Level Worker uses only one method of communication—personal contact. If his contacts could be enriched by his being trained in the use of audio-visual aids he could undoubtedly be far more effective. But being a general type of worker with several duties, he is not able to give his exclusive attention to agriculture.

There should be more Village Level Workers. In fact what is required is to have one Village Level Worker exclusively for agricultural purposes and another for other administrative purposes. However, even more important is that suitable arrangements should be made for the training of Village Level Workers so that they can inspire confidence of villagers. A recent study (Training of Extension Personnel and Farmers in Uttar Pradesh—Daulat Singh and V.K. Srivasthava) has shown that amongst the excellent performers, 64.84% had received formal training, whereas among the poor performers 71.43% of the personnel had not received any formal training in Agriculture. The same study shows that the Village Level Worker and other extension officers felt that training

should be imparted in the following rank order: (*a*) subject matter in agriculture; (*b*) programme planning and development; (*c*) evaluation, research, reporting, reviewing and consideration (*d*) communication; (*e*) extension service, organization and administration; (*f*) social system and (*g*) human development and educational process.

To this list, I would like to add two more items, androgogics and practical training in the use of audio-visual media. At present the training of extension personnel is arranged in four ways. First, in the extension departments of Universities and colleges there are courses suitable for those desirous to become Village Level Worker. Except in some of the recently established Universities, the courses in agricultural colleges suffer from excessively academic approach. Moreover, many Village Level Workers were appointed without such qualification. The second kind of training is the pre-service training given to all recruits to the posts of Village Level Workers. This is the principal basic training for the initiation of the candidates into their work. But by itself the training is inadequate because of the pace at which scientific and technological developments are taking place in the agricultural field and making needs of the earlier knowledge out of date. That is why the third category of training namely training in structural in-service training is important. These are short intensive refresher courses in specific disciplines. More effective than even these is the informal training that is imparted in the course of workshops and seminars held as a preliminary to undertaking a countrywide programme. Thus, for the high-yielding varieties programme every year a chain of workshops has been organised beginning with Directors of agriculture and going down to the District and block levels. This informal training is meaningful because it is part of the programme of production. Practical issues are raised and solutions sought through discussions.

Another kind of in-job training of Village Level Extension Officers that has not yet been given a trial could be training through correspondence supported by radio programme directed towards the Village Level Workers. Extension Officers operating in the countryside

tend to get out of date ; if they could have a bulletin, could write about their problems and be given guidance without having to leave their work, they would be more useful to the farmers.

At the block and district levels extension officers have to be specialists such as those for crops, cattle-breeding, poultry, maketing, credit, etc. Under the Farmers' Training Scheme for H.V.P. areas, there are peripatetic teams of instructors who are expected to arrange for demonstrations, meeting of farmers and formation of Farmers' Groups. Thus, we have three kinds of officers : the implementing officer such as the Village Level Worker and District Agricultural Officers, specialists and those specifically responsible for making arrangements for training. The Block Development Officer at the block level and the Collector at the district level have to function as coordinators. In some States, officers from the agricultural service have been appointed as Block Development Officers. By and large Block Development Officers and District Officers are drawn from the general administrative services.

That such generalist coordinators are unavoidable in a developing society results from two factors. Finances for most development activities come from development. Consequently the local representational institutions cannot have effective control over the staff. As between Specialists and implementers, coordination is essential. The generalist-administrator has other advantages. He represents the entire corpus of government. Historically, too, other departmental representatives have been in the habit of consulting them for their problems. In the past, government was not concerned with development work. That is why district officers were mainly engaged in law and order and collection of revenue and their training also was on these subjects. They were to keep an eye on the state of agriculture and arrange for government loans in the event of failure of crops. But there was no occasion for them to attend to the production-problems for farms, adoption of new technology, movement of inputs and produce, arrangement for credit. All these matters now fall within

their purview. But they lack the training and background for leadership in this field.

Agricultural development has therefore to be an environment for the administration in the district, and the Block Development Officer and the Collector as the co-ordinator have also to be indirectly instructors. They will not give instructions on specialist matters. But they have to explain to farmers, the significance and details of any scheme involving several specialists. They cannot do so unless they have themselves understood the A.B.C. of agriculture, and know the latest trends in agricultural development. In recent years two kinds of training programmes have been attempted for administrative officers; a pre-service training programme for I.A.S. officers included attachment to an agricultural University for a period of three or four months. This has not succeeded because the training has no connection with the kind of work that these officers would be expected to do later in their career. It would, therefore, be better if they could be posted to blocks and districts where a particular agricultural programme is in operation such as I.A.D.P., H.V.P., Dry Farming, Command Area Development, Small Farmers' Scheme, etc. In that situation they would understand the problems of farmers in the context of those schemes.

The other kind of training which has been more successful is the Collectors' Seminar at the National Academy of Administration. A group of 10 or 12 Collectors from different parts of the country are invited for 10 to 15 days. On subjects of current information, specialists and senior officers are invited to speak and to join discussions with Collectors who speak from their experience. The seminars held so far have been lively and useful. Collectors have become aware of the complexity of agriculture and have cleared their ideas about the feasibility of several programmes initiated by government. In their districts the Collectors who participated in these seminars would be able to give the lead to their team and confidently communicate with farmers.

It is because Collectors were not included in the teams of State, District and Block Level Officers who have given

training in rice production in October 1967 in the Raipur District, that there was very little follow-up activity by the trainees. Otherwise, however, this experiment of using an I.A.D.P. District as a training ground for officers was very significant. Trainees were in teams consisting of persons from different levels so that they could form a cadre with the same training experience. Half of the instruction was in the field, half in the class-room. Realistic field practicals were possible because plots were planted in advance of training at staggered intervals so that all crucial stages of rice growth could be covered.*

Another experiment in training was of sending some instructors and other officers to the International Rice Research Institute, Philippines, for training. On their return eight of them trained 500 people in 1969-70 and another 650 were trained in 1970-71. This was possible because the training was on a subject (*viz.* improved rice production) on which a large programme had been introduced by government.

Connection between training and current programmes of production is essential. Absence of such connection has reduced to a mere routine the pre-service and refresher training provided at the Village Level Workers Training Centres of which the total number is nearly 810. These training courses have been generally out of date. An additional reason for the inadequacy of these courses is that the Village Level Workers Training Centres have hardly any links with agricultural Universities and research centres where latest work is being done.

What kind of training is necessary for instructions in functional literacy ? Even though there is plenty of coordination between Education and Agriculture Ministries in India with regard to the Farmers' Training and Functional Literacy Programme, the tendency has been to keep literacy teachers distinct from those who impart training in professional matters. Most literacy teachers are drawn from the ranks of school-masters who may or may not be

*See mimeographed report, Ronald G. Green and Vernon L. Hall : "Paddy Production Training Programme" (New Delhi, The Ford Foundation, December, 1967).

owning land or doing cultivation. Whoever takes functional literacy classes should be given a thorough and practical training in agriculture and in particular to major programmes in which the farmers to be made literate are involved. Indeed, it would be preferable to engage as literacy teachers persons who have graduated in agriculture. They would be familiar with the vocabulary in which the farmer is interested and that could be the basis of introducing the learners to reading and writing.

Earlier in this chapter I have listed the subjects in which the training of trainers and instructors is necessary. Equally necessary is for the trainees to know the management, planning and organizational side of a training programme. How to arrange a demonstration ? How to form groups of farmers ? How to help farmers in drawing upon Plan ? These are some of the responsibilities that an instructor of farmers is expected to discharge.

Every time one communicates with an adult farmer, it is an educational act. The shopkeeper in the regulated market, the banker who gives credit, the salesman of fertilizers, pesticides and machinery, the government extension agent, the scientists who lays out demonstrations—they are all educators. In the adult world everybody is a teacher and everybody is a pupil. For the farmer also gives to these something of his wisdom when he meets an outsider. The important thing for an educator to remember is that he is in the service of the people and not just as agent of government. He should avoid any show of superiority. He should have respect for people no matter how backward and uneducated they be. As far as possible, one should try to speak in the language of the people and avoid talking over their heads.

8

Women Farmers and Young Farmers

Training for women has in the past been considered an operation distinct from training for males and children. Perhaps institutional training had both historically and as a social necessity to be separate for men and women.

But for Adult Education as such and for subjects that are of common interest to men and women, this kind of separate educational arrangement is unsuitable. In fact it leads to imbalance in the very development which is a purpose of such adult education. The idea therefore is beginning to take shape that adult education for families should be planned and attempted on subjects that are of common interest to both husbands and wives. In West Germany a body called Central Bureau of Political Education recently (in 1971) organised what was called "Family and Society Today" course. It was really an experiment to find out how working class families would react to an exposure to a two week experimental course in a surrounding which is so picturesque as to put one in the holiday mood. This two-week experimental course was conducted at Dorfwvell Family Holiday Centre in a place called Taunus. The employers of the 24 working class families who were invited to participate in the course for two weeks continued to pay their wages for this period while accommodation was provided by the Central Bureau for Political Education. Seemingly the family paticipation was based upon a practical consideration ; the parents would have been unable to find neighbours willing to look after their children for two weeks. But there was a deeper motive, to give a trial to the technique of adult education for the family. Of course the children were taken care of at the spot but separately by some teachers, while the parents attended the course. The older children

were given ordinary school work while the younger ones attended Kindergarten. There was plenty of sport and conviviality for the relaxation of the participants.

For the parents the object of the course was to stir to action the people attending the course and to try new educational methods so as to gain further information. No attempt was made to feed them with information, as a one-way process. Participants were primarily stimulated to think and discuss for themselves on the basis of the talks and material provided to them. In fact no firm programme was fixed by the organisers before the start of the course. Instead it was worked out together by the organisers and the participants.

The participants were formed into groups of 10 to 12 persons. Each group discussed problems, set the main points of interest which were dealt with by other new groups during the rest of the two weeks. Thus the problem groups developed into Interest Groups. Each Interest Group had an Adviser drawn from amongst the participating married couples, but selected in the light of their educational qualifications.

Interest was also lively as the programme was exactly what the people wanted. The whole group sought to discuss special subjects, subjects which at that time were uppermost in the minds of the people in Germany. Some short talks were given and newspaper articles and volumes were provided for supplementary information. The participants brought out a daily paper written by an Editorial Board of their own.

At the end of the course, the participants, the organisers and the journalists had a meeting in order to assess the value of the programme. There were no two opinions about the success. Because of the methods used for the discussions national barriers to speaking and writing were overcome in a very short time. This experiment had given to the Central Bureau of Political Education a basis for organising such programmes for every part of the country and in other fields.

Though this experiment was done for the working classes, it followed a method no less relevant to the Indian

farming situation. In many parts of India not only decision-making but also operations in agriculture are a family task. While usually the husband and wife jointly take decisions, instances have not been wanting when the husband was overruled. Funds are kept by the wife. Contacts with the outside world are no doubt a responsibility of the husband. But even here variations from community to community have been noticed and there are certain communities where even these contacts are the responsibility of women. As for agricultural operations various stages of preparation of land, application of fertiliser, sowing of seeds, transplantation, harvesting and marketing are distributed between husband and wife and older children, keeping in view both their convenience and the traditions of a particular community.

Unfortunately in most training programmes organised under the auspices of governments this important factor is hardly ever taken into account. Most training is organised for the male farmer, sometime for young and sometimes for older farmers. But little attempt has been made to a join training programme for the husband and wife together even though the object of farmers' training is something which concerns both. The German experiment indicates the way.

In a dynamic agricultural economy the urge for equipping oneself better is often a direct result of higher economic status resulting from improved technology. The identification of higher economic status with better educational equipment extends as much to men as to women. In the Punjab round-about Ludhiana Agricultural University a number of prosperous farming families have lately been attracted by training facilities for women both in home sciences and applied nutrition and improved agricultural practices, which the University had been offering in the form of short courses on its campus, but without prospects of any degrees or diplomas. Three such courses provided by the Home Science Department of the Agricultural University of Ludhiana have become prestige courses for the daughters of the better-off among farmers. It is for them a modernising experience which goes well with the environment of modern technology on

the farm. It improves also their prospects in the marriage market and makes of the girls better partners to men who operate tractors, machinery and modern harvesters.

The question naturally arises why farm women's training has failed to draw the farm working women particularly the labourers. Partly this is due to the fact that those responsible for training have not been able to isolate those agricultural practices in which the working farm woman is specifically involved. In fact, it is doubtful if separation of those elements is at all practicable. The entire farm operations in the case of agricultural labour are a family pursuit. A training programme for farm women has, therefore, to be conceived as a process of communication and demonstration to the labourer's family. In the dry farming area of Anantpur in Andhra Pradesh, it was discovered at an early stage that the farm worker's family including women must work together with the labourer to understand the practices that are necessary for the conservation of the moisture. Wherever women work on the fields, the link between their work and the rest of the agricultural operations is essential to the success of the new practices.

One difficulty is of getting women instructors who can effectively communicate with farm women labourers. Educated Indian women have not been attracted by agriculture and it is a bigger problem to get instructors who have had a background of practical agriculture. The capacity of women instructors to carry conviction with farm women was often limited by the fact that they had to convince men employers of its utility. This was particularly true of courses for agricultural labour. In a farm extension programme in certain villages near Udaipur, the University department found it easier to impart the skill of improved practices with regard to the cultivation of vegetables in the small plots of household land where even the 'parda' women could work all by themselves and demonstrate achievements. This kind of kitchen gardening readily appeals to the busy mother of the family. Near Udaipur some of them were organised into small Kitchen Gardening Clubs and these clubs were given facilities in the form of fertilizers and

improved seeds. Women instructors also could use these kitchen gardens for promoting nutrition programmes and organising poultry raising and other connected activities.

Training farm women will, therefore, develop in the future in these three directions, namely, short courses on the campus for girls who wish to equip themselves better in the homes of dynamic agricultural environment, kitchen gardening activities and demonstration in improved farm practices for women labourers. This last is the most difficult. Most farm women are wage earning labourers and unless the employer is convinced of the advantages of these labourers learning the new skills, he would not give them higher wages for better performance. The tendency is usually to assign to women work in which quantitative performance is the basis for the determination of the wage and not quality. Transplantation could be far better and the yields far more if women labourers were taught the latest methods of spacing and depths of the transplantation. But their supervisor usually judges performance on the basis of the speed. It is possible, however, that wages could be linked to qualitative performance in a given area by a whole family of labourers.

An incidental advantage of this kind of family approach to training and demonstration would be that the marginal land which most of these families have either under an informal or formal arrangement would be better cultivated. Recent experience of such marginal land belonging to wage-earning labourers around the land of progressive farmers in the vicinity of Lucknow has shown that the higher wages available to them for working for progressive farmers are often regarded by them as sufficient for their subsistence and they do not wish to put themselves to the trouble of improving their marginal land. Close enquiry, however, discloses that the reason why they are disinclined to improve their own land is for want of easy access to inputs like fertilizers and pesticides and improved seeds. A progressive employer of such agricultural labour can, however, be a radiating point for improved agricultural practices by his employees. He may have to take the trouble of keeping a stock of inputs

that might be loaned to the labourers. He might even be willing to sell water to them from his tubewell at reasonable rates. But the advantage to him would be that the land surrounding his own improved one would have better crops so that the large compact area of good crop would not attract birds and parrots etc., who are otherwise attracted by the lush green of the island of a good crop. The trained family would of course give better service to him and he could well become an educator for a farm community. This role of educating and leading the small farmers' families has not unfortunately been assumed by progressive farmers, some of whom seem to be jealous of spreading the new technology among potential rivals. In fact, the small farm family is not a potential rival. The doctrine of farmers' education is best tested among the small farmers and agricultural labour. Communication of information of demonstration and discussion is the best way of assimilating such information.

One of the few places where an experiment of the training of farm-women in improved farm-technology has been attempted is in the Shadnagar block of Mehboobnagar district. The Andhra Mahila Sabha was given a grant of Rs 85,700 by the Freedom from Hunger Campaign Society early in 1970. The Sabha selected three women graduates in Science and put them under training for a period of six months at the Village Level Workers Training Centre near Hyderabad (Rajendranagar). It was decided to have a phased programme for 50 villages in the block. A beginning was made with 25 villages by conducting a thorough survey householdwise among other things, information regarding the field operations usually being done by women, and the extent of interest of farm women in improved skills and techniques was collected. Thereafter in each village a demonstration plot in a farm woman's land (area from 15 cents to 50 cents) was selected, four kitchen gardens were raised and 30 farm-women were constituted into a radio discussion group.

The three women instructors were after their training, each put incharge of 8 or 9 villages in which they covered about 1,500 farm-families each. The women instructor

was assisted by a Demonstration Assistant. By September 1971, 21 demonstration plots had been laid out for the High-yielding varieties cultivation. Every stage of farm operation was demonstrated for 6 crops including 4 new varieties of paddy, one new variety of castor (ceruna), ragi, hybrid maize, hybrid jowar etc. During demonstration special emphasis was put on soil testing, seed testing, transplantation from nurseries, inter-cultivation, compost, pits, plant-protection measures. The use of mini-sprayers was popular with those who raised kitchen gardens. The three women instructors discussed with groups at the farm-sites field problems as and when they arose.

Discussion groups seem to be taken more seriously by women than by men and have been an excellent source of disseminating information and sorting out problems. Group disscussions covered not only farm-problems but also family life subjects such as nutrition, mother-care, child care, principles of health and sanitation. Each group was supplied with visual aids such as charts, flip books, hand-outs and models. Women instructors occasionally attended these group-discussions and guided them appropriately. Preservation of locally available fruits has been a popular group activity. Learners were also explained how they could obtain tools and equipment such as power-sprayers etc.

Within a priod of a little over 2 years it is expected to provide training to over 30,000 women. The response so far has been encouraging. One attraction to those whose land has been used as demonstration plots is that for the first crop of the demonstration plots the project provided essential inputs free of cost. After the cycle of two crops had been completed women-trainees were taken on an educational tour to west Godavari district.

A discussion with women instructors revealed some gaps. Thus, most of the attention appears to have been given in every village to women who owned their land. These women attended talks, and instructions given by the instructors and adopted innovations according to their capacity and joined discussion groups. Consequently women who work as farm labourers on wages in cash or kind are left out because they do not have their own

land. Some of them do collect around the instructor when she gives talks (instructions) but they are not treated as trainees. Actually it is the labourers who are on the fields for various operations, and therefore demonstrations and practice are important for them. Many owners employ these labouring women and it should not be difficult to make a list of such wage-earning farm labour among women. For many villages such lists should be got ready by the instructors. In fact it would be a good idea if the responsibility for getting together the labouring women could be given to every owner-trainee. It will be in the interest of the learner-owners that their labourers should have such training because with understanding the labourers would be able to follow improved practices in the land belonging to the farmers. Learning itself would thus become a cooperative process.

In this connection a further step needs to be taken. Owner-learners could be persuaded to raise wages as their yield increases. This would be an incentive to labourers to join training groups and to attend demonstrations. Sharing of the profits from higher output with labourers, would promote goodwill.

The Farmbooks of most owner-learners are at present written up by instructors when they visit them. It would be better to entrust this job to a literate person in the group. Indirectly this would stimulate interest in functional literacy and the farm book itself would become a primer.

It seems that after the initial experience women instructors and field officers felt the need for local inter-personal communications. Though the percentage of literacy among women was low (12%) it was possible to get a few literate young women to function as local workers on a monthly remuneration of about Rs. 20 each. This has made communication easier for the city-bred women instructors and Field Officers. The local workers are given a special orientation in improved farming family, planning and nutrition. This aspect of the project needs to be developed further. These local workers would be able to pick up the new technology of agriculture much faster than urban-bred arts or science graduates.

The fact is, that according to a survey, in 7 out of every 10 farming operations women participate or play a central role in this area. It also appeared during the survey that women cultivators owning their own land were more interested in knowing about the high-yielding seeds, women working as landless labourers and Harijan and backward classes women had greater interest in knowing improved transplantation and broadcasting methods. Another conclusion of this survey was that women in the age-group of 14 to 19 years were the keenest to learn new things. Early marriage being common in this area, the practice is for young girls to stay for 4 or 5 years with their parents before returning to their husbands. Those are the years in which, if exposed to new ideas, information and skills they could assimilate most and could influence their families later on.

The age-group 14 to 19 is important alike for men and women since during the period they are keenest and most susceptible to new influences. It is for this reason that the education of young farmers needs to be considered separately, even though so far as work and environments are concerned there is really not much difference between young and old farmers. They are both engaged in the farming professions and the training for both has to be the same, serious and professionally competent. But on account of the proneness to the modern outlook in the lower age-group farmers' sons (and daughters) below 19 years who are either school leavers or have never been to school, would benefit from a specially tailored training programme for them. If at a young age they could be exposed to the modernizing process in farming, they would be active agents for the transformation of agriculture. India has had a number of programmes for rural youth, mostly based upon western organisations such as the 4-H Clubs. In western countries agriculture is already a modernized activity, and rural youth organisations aim primarily at overall development of the personalities of young people. Such overall development of young personality is of course a desirable objective. In India during the early phase of the community development programme, consistently with its philosophy of multifaced rural development, institu-

tions such as youth clubs were promoted. But in an economically backward country overall and multisided development results in the neglect of the basic economic activity which gets diluted by numerous cultural and educational programmes. Once a society acquires economic strength on the basis of higher agricultural production the other aspects of the development of human personality can follow. But the first task of a project for farmers' sons and daughters should be to improve their agricultural skills and make them agents of the modernizing process in agriculture. One reason why Basic Education of Mahatma Gandhi did not succeed in independent India was that it did not treat agriculture as a central craft for students and farming that was included was traditional and not modern. It could not therefore be an exciting experience to today's young people. The problem in many developing countries is that young people tend to drift from villages to towns because among other things they do not find agriculture to be a modern experience. This is particularly true of school leavers whose courses of studies have little in common with the environments of an agricultural society.

Two basic policies seem therefore to be essential for the educational system of a country like India. First, in curriculum of the general schools a study of agriculture,— its botany and its economics — in the neighbourhood of the school should be an essential element. Secondly, whether in the general courses or in specialized courses for farmers' sons, the modern scientific aspects of agricultural operations should be emphasised and practical training in things like laboratory tests of soils and seeds and use of power sprayers, use of small machinery, power tillers, small harvesters, hoes etc., the working of the marketing mechanism, storage etc., should be given. That will give to the young learner the confidence that agriculture is not just a paternal profession to be continued by one generation after another in a traditional way for subsistence, it is a modern activity equal to industry and that one can have as modern a life as in an urban situation, if one practises modern agriculture.

A large number of schools have sprung up all over the countryside since independence. Boys and girls from

farm families come to schools from their homes and return there every day. An excellent opportunity thus exists for influencing the mind of the parents in favour of improved agricultural technology through the young pupils. Every school should have a competent agriculture expert as a teacher with some responsibilities towards the community. Instead of merely concentrating on the vegetable garden in the school campus, this teacher could assist the parents of some of the pupils to develop their plots as demonstration farms. By involving his pupils in farm-operation he would be able to introduce his pupils to theoretical subjects like botany, soil sciences, geography and economics. This could well become the missing link between the school and the home. If the parents are illiterate (as most of them are), the son could maintain the accounts, fill up the forms and write down the farm-plan. All such activities could count towards his credit in the school. The years in the school would no longer be regarded as a waste by the parents in whose eyes the school would be a centre of light for the community.

We have lately been hearing of community school for India. In a country with agriculture as the basic craft a community school can arise only out of the link with agriculture, the principal theme should be that. Otherwise there is a danger of community schools becoming a hotch-potch of various aspects of the growth of better rural life. Such overall development should follow in the wake of economic stimulus generated by farm development. Today the general impression among farmers is that an educated person is not supposed to be engaged in agriculture, he should go in for service in the city. By introducing pupils to the modern processes of agriculture as part of the school programme it is possible to remove this impression. The pupil can thus become a channel of communication between the home and the extension agent.

Apart from this approach to young people in schools, farmers' sons who are already out of school, or have never been to school can be exposed to modern agriculture through institutional education in agriculture and through non-institutional devices. Japan gives interesting examples of both kinds of training programmes for young farmers.

The Ministry of Education in Japan has provided for the education of agriculture, forestry and fisheries in 49 senior colleges and 10 junior colleges. The number of senior high schools that have courses in agriculture is 540 with 224 branch schools and the total number of courses is 1,277.

Ministry of Agriculture, Japan has five different kinds of programmes for youth that is out of school (*a*) Agricultural management training farms, this training farm is mainly for boys and girls who have finished their junior high schools and who wish in the future to become farmers. The period of training is two years with the basis of education put firming on actual work and with the understanding that everybody lives in a dormitory together. (*b*) Regional Training Centres for Farm Management. These training centres are for youngmen and women who have finished their senior high school education or its equivalent and who wish to receive tra ning in the field of livestock raising or horticulture farming. The period of training is about a year. (*c*) Rural Youths Training Houses. These houses are equipped with roaming and boarding facilities for short term group training courses. (*d*) Rural Youth Movement Promotion Centres; from the year 1966 buildings with the purpose of offering facilities to rural youths for training and studying and even for gatherings without the need of staying over have been built in the main agricultural districts. (*e*) Ministry of Agriculture and Forestry Central Training Centre for Rural Youths. This centre was established as one concrete policy for training future farm managers. The period of training is 3 years. Training consists of agricultural education, actual work on farms and actual work at home with the purpose of educating men who will become heads of not only owner farms but also in the locality in the future.

These facilities are in addition to the extension staff in every prefecture. The Japanese aim seems to have been to provide opportunity for agricultural training after every school stage. The arrangement also takes into account the fact that young farmers on their farms may be available for long period at a time.

In India only two attempts have recently been made to provide short training courses in agriculture to youth. One is in Vizagapatnam where a young Farmers' Organisation has with assistance from the Freedom From Hunger Campaign started a training centre for young farmers; the other is at the Literacy House Lucknow, who have only recently started a Young Farmers' Institute. In both cases land was acquired for the training Institute's farm and a beginning was made by inviting young farmers to join the courses spread over periods varying from 3 to 9 months. But the Institute had no operational contact with the farmers' in the neighbourhood.

The Young Farmers Training Institute at Literacy House, Lucknow is therefore changing its method It is now picking up villages round about in which demonstration farms can be laid out in private farmers' fields. Help is also being provided to the neighbouring farmers by giving them on hire, tractors and other equipment on reasonable charges. Thus the Institution is seeking to make itself acceptable to the farmers to get to know their problems and to build up a programme of training around those problems.

The experience of the Udaipur Agricultural University is that in a more backward situation where some boys are in any case sparable for want of employment, it may be useful to begin by training young farm leaders on the University campus so that on going back to their villages they may be able to initiate activities such as formation of Farmers Clubs for organised activity and for discussion. The trainees have thus spearheaded a modernization movement.

Situations are different in different areas. In a large country like India most youth activities and programmes have suffered because regardless of the requirements of the local situation, a uniform kind of youth activity and organisation have been introduced by the governmental machinery. It was so with the Rural Youth Clubs programme started as a part of the community development project during the 'fifties'. An example of the effect of local variations is that at present with

increased use of tractors, harvesters and other machinery in the Punjab, Haryana and West U.P. many young men are interested in the training in farm-machinery so that they may be able to supplement their farm income by repairing machinery and functioning as operators. On the other hand in an area like Anand in Gujarat where an excellent milk collection scheme has been in operation the interest would be in training for cattle breeding and fodder crops.

Two things seem clear. If the young trainee is to carry weight with his parents his training should be practical so that he can show by doing that his new methods would be more beneficial. Moreover, the training should result in the young farmer becoming an economic asset to his family. For this purpose it seems necessary, in a country with small holdings and large population to impart to young farmers training in a subsidiary farm activity such as poultry farming and vegetable growing. This would enable the young trainee to make a start with an advantage.

Young people who attend courses at a centre, become on their return to their villages like lonely flames easily extinguished by a whiff of cynicism from an old timer. It would be the duty of training centres to maintain contacts with all alumni, to send to them a bulletin, to examine their problems and give them advice. Occasionally there should be re-unions at which experiences can be exchanged. The sense of belonging to a fraternity brings a great deal of self-confidence.

If a subsidiary farm activity has been taught at the centre, a plan for the sale of the yields should also be worked out as a part of the training at the centre. Sometimes if the trainees belong to the same area, they could be formed into say, a poultry raisers club or society which would do the marketing on behalf of the rest. The duty of the training centre thus is much more than that of an institution concerned with training only.

Such training should also lead later on to educational trips by young farmers to other places in the country, particularly to agricultural universities. This should come

as a reward to those trainees who demonstrate effective adoption of new practices on their land. Farmers Exchange programmes with farmers of USA is not so necessary as one of trips within the country. Such facilities to young farmers will hasten the phase of modernization and give to them importance as opinion leaders.

9

Role of Research and Universities

It has been the habit particularly of sociologists and I am afraid even of economic experts to overlook the impact of historical developments upon those engaged in the developmental process in the field, such as farmers. Perhaps, this is in one sense unavoidable. Most economic and social studies call for painstaking collection of data and experiences over long periods of years. By the time these can be formulated into a book or a theory, one gets out-of-date. In recent years particularly after World War II, science has accelerated the pace of development to such an extent that economists and sociologists often fall behind times.

It is for this reason that many theories about the Indian farmer, his capacity for the adoption of new practices and the problems of communication and training were built up in the light of the experience of what may be called the pre-HVP period. Until the high-yielding variety seeds in which I would include also the hybrids, came on the scene, most studies gave depressing results. Though some of those British economists and administrators who had their experiences in East Africa generally harped upon the immense value of the preparatory training stage before the introduction of improved agricultural technology, even they did not care to relate training to production, to scientific development and to the accelerated pace that would result from the introduction of new technology.

Consequently most of our training programmes in India during the fifties overlooked and 'skirted' research. They generally emphasised whatever could more efficiently be done within the limited and rather primitive technology of the farmer. It is not surprising, therefore, that much of

the effort of training at that stage and of extension, as it was called, yielded results not quite commensurate with the effort that was put into them. Since the population explosion had not taken place by then, the food production problem and agriculture in general seemed to occupy a secondary place in development planning in various countries. But that alone was not the reason for the exasperating failure of most of the training and extension programmes for farmers.

Much of the scientific research itself in the field of agriculture was dispersed among scientists of varying abilities in the different parts of India. There was no coordination and there was no central initiative. This was aggravated by the fact that the whole concept in the Indian Plan of what are known as 'Centrally sponsored schemes' was vitiated by the peculiar logic of giving funds to the States, but not giving them guidance in the detailed implementation by the 'States' technical workers. According to some observers of the Indian development process, this caused a serious setback to many a plan scheme at that time (*i.e.* during the fifties) while still involving the Central Government into heavy expenditure.

The result was that sometime in the early sixties there was among the States leaders a consensus against further multiplicity of Centrally sponsored schemes. A decision was then taken (which in the view of some could have been preceded by a more careful consideration of all the implications) that the number of Centrally sponsored schemes should be drastically cut down. No distinction was made between programmes and their working. It was a blanket decision. The result was that the already frail link between agricultural research and development was subjected to a severe strain. For decades Indian agricultural research has been blighted by a peculiar parochialism. Many research centres (usually controlled by State Governments but assisted by ICAR) tended to conduct themselves like what are known in Sanskrit as Koopa Mandookas *i.e.* frogs living within wells and imagining them to be mighty oceans. There was a tendency to regard their own research results to be of the utmost importance, to refuse to see the similarity between the

results obtained by them and their colleagues, to deny superiority to the seeds developed by any other research centre for use in their own areas, by being rigid in meetings of the Varietal Release committees. The result of all this on the farmer was that the agricultural researcher became for him a remote being—a person concerned with his own quarrels and of little practical value to himself.

The change began towards the end of fifties and the beginning of sixties partly because of the introduction of new seeds and other new technology. At that stage, the sudden success of some new technology and seeds shook the torpor and the sense of extreme self-satisfaction of quite a few researchers. Even though the tendency in the beginning was to attribute success to chance, it was soon realised that scientific results are not obtained by merely chance miracles and that behind them lies not only hard work but, what is even more important, coordinated work.

At that stage the ICAR introduced what has since proved to be an effective device *viz.*, All India coordinated research programmes. In these All India coordinated research programmes the researchers operating in different parts of the country but on similar problems function as teams, each team being concerned with a specific problem commodity. Consequently, the ICAR and therefore, the Central Government had indirectly to add to the "Centrally sponsored schemes" though under a different nomenclature, *viz.*, Central schemes. The old inhibitions had to be indirectly got over. Funds were still provided by the Centre through ICAR but guidance was also given by the ICAR and the work was done in a systematic way in different parts of the country by individuals who administratively were under the State Governments or Institutions or Universities. Undoubtedly this has helped significantly the growth of agricultural research, specially field research in this country, in the last few years.

It is necessary to give this historical background in order to demonstrate and establish the link between agricultural research and adult education for farmers. Agriculture has, as a result of modern technology and research undoubtedly become a highly complex business.

Even the most primitive farmer has come to know the 'magical touch'. A remarkable example of this was noticed recently when it was found that the Adivasi (tribal) farmers of certain parts of Gujarat took no time in adopting what is known as Hybrid 4 cotton. The preparation of Hybrid seeds is a complex process. It is laborious, it required strict and constant vigilance. Adivasi farmers near Baroda got interested through a training programme which of course was very informal and based upon demonstrations. What drew them to this complex and laborious undertaking was that they could count upon a profit of Rs. 6,000 per hectare. For this reason they were prepared not only to invest labour but also money in obtaining large quantities of fertilisers. Hybrid 4 was the result of long and painstaking research. The awards of research lie in the realisation of the conquest over hurdles in agriculture through new knowledge and its application on the field.

It is not suggested that the adult farmer can himself organise research even if it be around problems that come his way. But the assurance of having in his close proximity a centre, a laboratory and a group of qualified researchers to whom he can take his problems and who can use his farm and his findings as a basis for tackling those problems would unquestionably involve him in the process of discovering new facts and learning them. This kind of applied and purposive research gives a greater sense of participation to the farmer than the more high level research conducted at national or State-level research institute. There the farmer is primarily at the end of a process. But in adaptive research he can be not only an observer, he can also be the starting point of the investigation process and can help or assist researchers from time to time.

Various devices of adaptive research have been attempted in India in recent years. One of these was to send out teams of experts to the district headquarters as well as to fields of operations where they could in the course of discussions with extension workers and farmers know about these problems. Such teams have been called Field Problems Units as were set up in the recent years with the

help of USAID. Another and the more extensive device has been to nominate research scientists from various technical departments of agricultural universities and to assign them to the farmers' Training district operating High Yielding seeds programmes where they are supposed to organise National demonstrations in the farmers' fields around certain improved practices. These demonstrations, however, are based upon proved conclusions in the laboratories of the research centres and agricultural universities. In the course of organising such demonstrations on farmers' fields, the scientists of these universities gather certain facts which require adaptation of the conclusions of the higher-level research done in the universities. This adaptation is a direct result of question-answers sessions with the farmers. Such question-answer sessions are arranged by organising gatherings of farmers of the neighbourhood at the farm where the demonstration has actually been done.

In 1969 extensive damage to paddy crops from pests in East U.P. and West Bihar led to the realisation that the time taken between the occurrence of a pest or an epidemic and its reporting to a research centre is so long that it is not possible meanwhile to analyse the problem and to organise effective first aid-measures to arrest the spread of the pest. It was not until ICAR was able to send a team of investigators that any effective measures could be organised. By then it was too late and much of the damage had already been done. In the light of this experience it was felt that the Central Government itself should finance the setting up of surveillance teams in some of the high-yielding varieties programme districts. These surveillance teams should be able to report quickly to research centres the problems as they arise and to convey the solutions proposed by researchers to the farmers through the extension service of the blocks. The setting up of surveillance teams is now a new scheme in the Central Plan of Plant Protection.

These three experiments have however been not without limitations and certain shortcomings have been detected indicating the need of an improved arrangement. These three devices suffer from the handicap that scientists

who are on the field and to whom the farmers can carry their problems are not in a position immediately to start the investigations since they do not have any kind of equipment near the spot. All that they can do is either to rush back to the university and research centre or to communicate the details of the problems to the centre quickly. However, if they were in a position to do some preliminary investigations themselves, they could possibly, detect a relatively simple reason for which locally applicable remedy might be found and suggested by them to the victims. This is even more true of measures necessary for applying the inputs or for preventive action. Take for example the application of zinc at the proper time, in a soil with zinc deficiency or steps necessary for ensuring moisture conservation in a dry farming area based upon soil analysis. The operation involving the application of chemical fertilizer often call for immediate laboratory analysis. A whole gamut of investigations trials and demonstrations can be effectively arranged in a local laboratory, almost within the sight of the farmer. Such trials, demonstrations, analyses and investigations, have sometimes been attempted at the headquarters of some of the integrated area development programmes such as Indo-German and Indo-Japanese Demonstration Centres. Originally a Japanese Demonstration Centre in India was a small model farm, and it was for the neighbouring farmers to come and see the middle-level Japanese experts using practices which could be followed by them. In the Indo-German Centres in the beginning the existence of a workshop provided facilities for tackling some field problems and demonstrating the results. Later however both the Indo-Japanese and Indo-German Centres sent out their experts to the neighbouring villages for identifying problems for seeking remedies at their own laboratories or workshops. However, the centres of farmers' training set-up by Government in districts do not have any laboratory or workshop worth the name and even if scientists of the agricultural universities visit them, they are not able to perform any experiments.

The setting up of district-level laboratories preferably at the farmers' Training Centres is, therefore, even more

necessary than organising farmers' fairs and maintaining museums. Some years ago, the Government of India in the Ministry of Education had financed the setting up of Vigyan Mandirs in selected villages. Each Vigyan Mandir was supposed to have a small museum, collection of posters, some testing equipment etc. As these institutions were not at all connected with any production or training programme, they remained merely islands of curiosity. But in a changed situation a Vigyan Mandir could be the nucleus of a field level laboratory and a place for demonstration and experimentation. Examples of centres of adaptive research of this kind are to be found in Japan. Japan is divided into a number of prefectures. Each prefecture in the matter of population and territory is more or less equal to a district in India. At the headquarters of the prefecture there is a farm centre which has, among other things: (1) a department for sale and supply of inputs as wells as machinery to the farmers, (2) a bank for giving credit to the farmers, (3) classrooms for young farmers for training in specific disciplines, and (4) a laboratory with properly qualified scientists and researchers and with the object of (*a*) pre-testing the inputs sold or supplied to farmers, (*b*) examining and investing problems brought to the centres by the farmers. All these units are in one campus and the farmer does not, therefore, have to go from one place to another. Farmers training centre at the prefecture headquarters is usually run either by the cooperative organisation or by the local government. The local government has been keen to take over the laboratory and research part leaving the rest to the cooperative organisations. But it was noticed that the centre which had the facilities provided by the cooperative organisation under the same umbrella along with the laboratory was more useful.

It is noteworthy that the prefecture level laboratory is in contact with the national research centres to which more complex problems are referred by its scientists for attention and guidance. Occasional consultations also take place. The farmer has the confidence that he could carry his problems directly to the prefecture laboratory where his problems could receive attention and he could

perhaps, forthwith get an answer and suggestions for action. In that process, of course, he can learn himself to identify problems and to detect factors responsible for failure or success. These prefecture laboratories are, of course, in receipt of scientific literature from the national laboratories and the researchers themselves were thus undergoing refresher courses. Young farmers' training is linked with these research laboratories.

The difference it makes to farmers to have a laboratory within access to them, is demonstrated in a small way at Anand in Gujarat. The Kaira Cooperative Milk Producers' Union has a centre for collection of semen. This centre has got a "lab" where the semen is filled into phials and where the available microscopes are used for observing the break-up of the semen and other operations. There are on the walls a number of posters indicating how artificial insemination has to be done. Right outside the laboratory is a place where the semen is extracted from the bulls. This laboratory is visited regularly by groups of women farmers and men farmers who are able to watch the entire process of extraction, anaylsis and bottling of the semen and thus are able to satisfy themselves how they stand to benefit from the use of artificial insemination for their cattle. These phials are later on sent to the villages along with the milk collecting vans. From each village one or two persons have been trained in artificial insemination.

The presence of a laboratory near their homes could stimulate the curiosity and widen the practical skills of farmers apart from enhancing their knowledge of the processes behind some of the problems and inputs that they use. The Kaira Cooperative Society, therefore, needs to have a properly equipped laboratory not only for artificial insemination but later on for crossbreeding and for the analysis of the cattle feed. So far as the testing of the quality and fat content of the milk is concerned, the existing arrangements at the milk collection centres give a glimpse of what happens inside a laboratory. Practically every farmer man or woman is able to see how the sample of the milk is taken, how the chemicals are added, how the results are assessed and then how they are tabulated. Ten

minutes in the milk testing centres is an education in elementary laboratory work, but if more sophisticated facilities could be made available at the centres of the Kaira Cooperative Union, farmers harassed by problems could have an even better idea. Already the Kaira Co-operative Union has a veterinary service and centre. The work of their veterinary doctors involves much laboratory experimentation. This could be another wing of the proposed field-level laboratory.

The important thing, however, is that these laboratories should function as they do in the prefectures in Japan and to some extent in some districts in India as a part of the production and developmental process and not merely as places for study and experimentation by scientists of problems encountered by them on the field. It has to be purposive research, it has to be applied and applicable research it has to be research around problems identified on the fields. Thus alone will the laboratories or Vigyan Mandirs cease to be only shrines or mandirs and be transformed into benevolent organisations which are of practical value to the farmers.

It is for this reason that centres like fish farms (improved seed farms for inland fishery) can become research units of practical applicability much more than a high-level inland fisheries research institute can. Being directly exposed to the problem indentified by the farmers and fishermen, they would not get involved in issues of academic value only. Some agro-industries corporations can use their workshops as laboratories for use by mechanics and operators. In fact, workshops give excellent opportunity to impart information to the users of the machinery when they bring their machinery for repairs. Every time that a repair is effected, the owner can learn something new about his machinery. At this stage the workshop owner or workshop foreman can hand-over to the user some literature with diagrams which the user can take back with him for his future guidance. An excellent illustration of how a repair and servicing centre has the potential as an educational centre is the workshop in village Muttom on the eastern coasts of India near Kanyakumari where fishermen every day bring their

outboard engine (that are mounted on the primitive catamaran boats) for servicing and oiling etc. At that time, the outboard engine is practically opened for servicing within the view of the fisherman. He learns about the parts and about the working the wear and tear etc., of those parts and can be given training about how engines operate and how they should be used and serviced. Most of these fishermen in Muttom are illiterate and ignorant. The machinery before them makes them knowledgeable. It gives them also an opportunity for becoming literate because through the diagram to the words, figure, and then to the letters would be a far more natural process for them to be literate than to start with the alphabet and through words and terms that are not of practical value in their work.

Enough has been said to emphasise how important it is for India to have district level laboratories each to be organised to meet the needs of farmers, fishermen, cattle men etc., in their district and each taking its clue from the specific development programme being organised in the particular district. It is obvious that every year some of the equipment will have to be changed and new ones obtained. It is equally obvious that this collection of equipment should not be allowed to become a dead museum place. It must be seen by farmers and used by research workers who are in contact with the work of the farmers and, therefore, also in contact with the extension men and instructors who will bring to them as many problems as the farmers themselves. The operations, in the laboratory will have to be coordinated with the operation of development programme as well as training programme and the programme of issuing inputs and providing services to the farmers. All these four functionaries will have to work together and will have to plan a month's programme in advance. They cannot afford to work in isolation from each other.

The district level or field level laboratory will have to have links with the university department concerned. This visualises frequent visits by the persons incharge of the local laboratories as well as scientific workers to visit research laboratories of the university in order to get

reinforcement of their knowledge as well as renewal. As these workers and the applied research laboratory will not be merely table workers but those with direct and fresh experience of the problems they can supplement the experience of the laboratory worker at the university centre. The university research worker is exclusively used to operating in ideal conditions. An exchange of views with the district level scientific workers would correct them.

It is not merely the research workers from the field problems research centres who should be able to visit the universities. No less important is the need for providing this facility to the farmers themselves who go in groups or teams to the universities so as to see with their own eyes the latest developments and demonstration on the fields. During the initial appearance of some of the high-yielding wheat seeds, streams of visitors visiting research farms at the universities and at the Indian Agricultural Research Institute were difficult to control. In fact, they were often tempted to rush upon the demonstration farm, seize the seeds and carry them home in order to have their private experiments. There is undoubtely this risk in getting teams of farmers and visitors to the universities. But such visits to the research centres and to places of work of scientists are essential for practising farmers who sometime wish to get an authoritative solution of their problems. These farmer-groups can also be taken into confidence about the risk of going ahead with seeds that have not been properly tested. Usually, at IARI, Pusa, the Pantnagar University, etc., they are able to see not only the exhibits and demonstrations of the latest practices, but also to put questions and give expression to their sense of disappointment and grievances. However, most of these question-answer sessions have not been useful to farmers because the farmer goes to the fair and to the seminar both as the seeker of knowledge and in quest of information regarding the supply of essential inputs to him. He is more tempted to ask questions on these latter matters because he is stimulated to try and adopt the improved practices demonstrated in the exhibition stalls. Unfortunately the input organisations and agencies

are represented by lower level staff who are not in a position to answer these queries to the satisfaction of farmers. A farmer putting questions is unable to make a distinction between those who organise the learning sessions and demonstrations and those who in his day-to-day experience are responsible for supplying him credit, inputs and other facilities on the basis of which he can organise his own programme of production. This only shows the incompleteness of the arrangements made for the education of farmers at these sessions.

The farmer is a composite being. It is not possible for him to isolate his personality as the user of inputs from his personality as the seeker of new knowledge and the learner of new skills. He has to think in terms of applying those skills. It is true that the grievances that the individual participants may have may be peculiar to those individuals and may not be of general applicability. It is also true that since these questions excessively dominate the seminars of farmers, attention is diverted from the improved farm practices and lessons to the arrangements made by governments and various other agencies.

A balance has therefore to be struck. In the first place, care should be taken to demonstrate only those practices and skills which the local administration, the local co-operative agencies etc., are in a position to support. This really leads one to the idea of organising such fairs and question-answer sessions for smaller and compact areas with common problems and common programme of action. A fair like the one held at Delhi in the Pusa Agricultural Institute would hardly succeed in focusing attention on the major practical problems because the practical problems are local, specific and applicable to small, homogenous areas. Therefore, fairs of this kind as well as seminars should be organised at centres of smaller areas where the local farmers can come. Seminars of the higher level for the more expressive and understanding type of farmers might be arranged at Agricultural Universities but in those, free-for-all question-answer sessions should be discouraged. Instead, some background material should be organised and distributed in advance and made available to the

participants so that they are able to make their contribution to the discussions in the same way as economists, agronomists etc., are able to do.

Exhibitions, field days and museums etc., should be able to highlight the contribution of research people to farmers' training. Even during the early fifties some attempts at farmers' training through extension were made by IARI of which at that time the Director was Dr. B. P. Pal. He has given an account of these experiments which he called "land transformation", in a few villages in the neighbourhood. Community development which followed practically left aside agricultural research because its philosophy visualised an overall approach to the development of the personality of the villager. In the late fifties and early sixties research came to the fore again as explained at the beginning of this chapter.

This was also the time when Government of India adopted the policy of establishing high level agricultural universities at least one in every State. In a sense, this policy was contrary to the efforts for the integration and coordination which the All India coordinated research projects envisaged. Agricultural universities of course were mainly concerned with education but because of their contacts with the land grant colleges and universities of the U.S.A., they had a fascination for extension work. American experts who came to agricultural universities in India could not always discern the contrast between the history and sociology of the two countries. So, they were rather disappointed with agricultural universities in India, their want of interest in extension and training programmes. The Ford Foundation which also has its Headquarters in the USA conducted a different kind of experiment, namely extension in the rural areas by experts and with the assistance of the people. The Integrated Area Development projects (IADP) demonstrated the immense potential of training and extension in selected areas by highly qualified people.

Did it, therefore, mean that agricultural universities had no role to play in the training and extension of farmers ? This, of course, was soon belied by the fact that the phenomenal expansion of the new Mexican-based

seeds of wheat in India were due to the demonstrations which a few scientists conducted in the private farm lands in the neighbourhood of IARI and Ludhiana Agricultural University. This was also to some extent true, though a little later, of the Agricultural University in Pant Nagar. It, thus, became clear that in their neighbourhoods both agricultural universities and research centres could undertake extension and training programmes with advantage to themselves. The last three words are important. The consideration was advantage to themselves. In other words, the demonstrations in the fields of private farmers were really meant as an extension of the laboratories of agricultural research centres and agricultural universities. It was not a training programme nor was it an extension programme. Of course the IARI has had an Extension Department. Extension Departments exist in a few other universities too. But truly speaking those are departments for teaching the methodology of extension. They are not responsible for actual extension and training work among farmers except what I have called extension of laboratories work.

A breakthrough in the attitude came, I think, first of all in the Punjab Agricultural University of Ludhiana where way back in the year 1964 it was decided to share the responsibility for extension work in the districts of Punjab. The University could count upon the cooperation of Punjab Government because of the contacts between the Vice-Chancellor and the Government. The procedure adopted was that selected scientists from the University were posted to districts and made responsible for guiding the farmers in the adoption of new technology and seeds. Coming as it did at a time when the new seeds had begun to bring unexpectedly high yields and income to the Punjab farmers this readiness of the agricultural scientists to leave the narrow prescincts of his laboratory and to go out into the farm of the private farmer was most opportune.

The Punjab experiment was not without difficulties and numerous instances of differences of opinion between the district agricultural staff of the Punjab Government and of the scientists posted to the districts of the University

came to light. What is more, the scientific validity of the advice given by the scientists was sometimes questioned by the Agronomists working in the department who had been used to considering themselves no less scientists than those in the universities. This was understandable. However, in course of time the situation was more or less brought to a working norm. I suppose partly this is because right from the beginning of the introduction of the new technology in the Punjab, informal training of farmers was provided at a time when the then scare inputs such as chemical fertilisers and pesticides and some of the new seeds were to be carefully distributed. The responsibility for providing these fell largely upon the department and the agencies, but for seeds they had to depend naturally upon the university which was preparing genetic stock as well as breeders seeds. Also the seeds being altogether new, their extensive adoption at that time required more detailed guidance many questions from prospective users had to be answered etc. Thus a beginning was made of composite demonstrations in which the display of charts, supply of inputs and answering of questions by scientists were organised jointly by scientists of Ludhiana Agricultural University and officers of the Punjab Government. It cannot be claimed that this undoubtedly ideal arrangement has continued all through since then. In fact, it will be hard to compile a systematic report of what is actually going on in the Punjab. But since the Punjab farmer has always been a man of initiative and knows where the goods can be obtained and where the information, he has never been at a loss.

This kind of boldness was not displayed in other parts of India and so the link between research and the farmers, training remained tenuous for a very long time until the Central Government decided to enter the field. Some attempts in the direction had earlier been made in districts called IADP districts, where the Ford Foundation experts, because of their personal contacts with experts in the nearest agricultural universities, were able to some extent, to involve the research scientists of those universities in the developmental work and the training and extension. The description of one such experiment has

been given in a report by the Ford Foundation. The report is based upon the experience in three districts in one of which *i.e.*, West Godavari district of Andhra Pradesh, the restraints to development were pointed out by a seminar organised by the Government of Andhra Pradesh in March 1968. Among the restraints want of coordinated working between the agricultural scientists of the Andhra Pradesh Agricultural University and the IADP staff of West Godavari district ranked high. In fact, even after this problem had been identified, discussions on it continued for years and as late as 1971 a joint meeting of the Chief Research Officer (Rice) from the Andhra Pradesh Agricultural University and the concerned officers of the Andhra Pradesh Agriculture Department had to be called on behalf of Government of India in order to insist upon coordinated working. Coordinated working is a necessity not only in training programmes but also in the entire development process of which the farmers' training is only one part. For example, it was pointed out that the university was not able to give the seeds of the particular high yielding rice variety which the farmers could grow with confidence during the kharif season. But a detailed discussion disclosed that there was a conservative resistance on the part of officers of Agriculture Department particularly of the Plant Protection Until of the State Government to take the risk of introducing varieties evolved by the research centre of the university. Caution against risks is understandable. At the same time initial experience of the introduction of the new varieties has shown that excessive conservatism on the part of some specialists of State Governments put those particular States far back in the race for development. There is a 'believe it or not' story of 1964-65 when one State Government to whom a wagon load of Mexican seeds was despatched for trial and multiplication, returned the entire wagon load to the Government of India. Though that State has now progressed in wheat cultivation it lost a couple of valuable years.

The study of IADP in the Godavari district disclosed another constraint too ; there was no system for providing new technology at the farm level, hardly any arrangement for conveying regularly information to the staff and

through them to the farmers. Matters like water control in the delta area required highly skilled directions the communication of which could only be done effectively by researchers. But, the Andhra Pradesh Agricultural University did not have adequate research arrangements for this work. As a result of discussions held in 1969 and 1971 the Andhra Pradesh Agricultural University agreed to post in West Godavari district five members of their staff to assist the State Government's extension staff on adaptive research on new technology. They were made responsible to the Project Officer. At a later discussion it was also agreed that the university researchers would hold a series of group meetings with the State level agricultural officers for identifying varieties and packages of practices for different districts having distinct agro-climatic conditions. It remains to be seen if this kind of informal consultation at the level of experts from both sides can become a regular feature.

In fact a problem is that though everywhere middle level experts and researchers are desirous to meet each other informally and come to an understanding, they have a vague fear that their superiors would not look with favour upon any attempt that they may make for coordinated working with respective counterparts. This is an old malady in governments both at the Centre and in the States, a malady that has continued in educational institutions also that were originally under government. Even the new agricultural universities are not free. In fact, some heads of agricultural university departments are very suspicious of coordination with others. Partly the fear is that whenever there is coordination, responsibility is distributed and so is accountability. In a bureaucratic system, accountability is a persistent bugbear. By accountability here, I do not mean the actual results, but accountability in administrative and financial matters. In agricultural extension and training, this can ruin a programme. It can go only if those responsible for training and extension, whether in government or in universities, change their attitude.

In the Pantnagar Agricultural University, two factors have assisted its dynamic role in extension work and

farmers' training. In the first place, it is located in an area where better-off and sometimes affluent families were settled, mostly those retired from the armed forces, for whom the Tarai jungles were cleared and to whom large blocks of land were given at a time when few ventured to go into that area The farmer who began to operate there did not need any motivation for education and training even in the early difficult days. Already he had been supplied with some inputs, howsoever out-of-date, by government. He was hardy, and had resources. So he made a beginning. The results in the beginning were not very promising but nothing like a disaster ever took place. They were already on the road when the new technology came. By that time the agricultural university of Pantnagar had been established right in the midst of the Tarai area. Here then was a centre of education and research that was dealing with responsive farmers having resources and large lands. There was not much difference between the land of university and that of the private farmer in the neighbourhood of Pantnagar whether in size or in quality, since most families had reclaimed large lands. In the beginning, in fact the resources of the university were not sufficient for effective guidance to farmers. A few years later a welcome opportunity presented itself. The World Bank appreciated that the success of the yielding variety seeds in India called for an extensive programme of production of such seeds under expert guidance. And, therefore, after protracted negotiations, a programme of sizeable financial outlay was approved for India by the World Bank involving a loan of Rs. 26 crores for the production of seeds in the Tarai area. A Tarai seeds Development Corporation was set-up under the leadership of the university, the loans being provided by the banks and of course the enterprise by the farmers.

Thus the Pantnagar Agricultural University began to play an effective role in the training of farmers in the modern techniques of production of foundation seeds and multiplication of different breeds as well as certified seeds. The area covered was 10,000 acres and most farmers in the area became members of the Tarai Development Corporation and acquired a voice in the affairs of the Corporation.

Most of these farmers are men with influence, money and enterprise. The area is developing fast and the best results of the training can be seen at the annual fair of the farmers in Pant Nagar University Campus. They are all mechanised farms, water is freely available, therefore, the training has to be far more sophisticated.

But the wart is there all right. In an article published in the *Times of India* (March 1972), Shri Ashok Thapar writing on the Changing Face of Tarai, has pointedly referred to what he cails big problems of the small farmers in the Tarai area close to the agricultural university. He writes : 'The use of high yielding varities jacked up wheat yields from 10 to 12 maunds per acre to an average of 25;...as a result ambitious farmers with 20 to 30 acres lost no time in acquiring the necessary new inputs. Gangwar's new tractor enabled him to place his entire holding of 30 acres under cereals, whereas previously he was able to command only 10 to 12... In Gurunanakpur, Vir Singh stuck to his pair of bullocks but managed to raise enough credit to grow high-yielding wheat. His first harvest brought him a yield of 40 maunds per acre. This was more than three times his previous average yield. But he still complains bitterly, for reasons that are not far to seek. In spite of all the mechanisation on the bigger farms, there remains an acute shortage of labour. As a result, daily wages have shot up from Rs. 1.50 to over Rs. 4. The growing popularity of high-yielding paddy is pushing them up still further and adding to his cost of cultivation. And so his net profit has tended to lag behind the increase in his output. His net returns are lower than that of the agricultural crops at a village called Adarsh Nagar ; but even so he is much better off than he was before the Green Revolution .. In Chamangunj, however, a very different picture emerged. Whilst Baldev Raj and Vir Singh were showing their first high-yielding crop Daya Mal and his companion could do little but stand by and watch. Being small farmers with inadequate resources, they were in no position to purchase the necessary inputs. As far as they were concerned, 'farming was a way of life and not a business'. It seems that in 1968 the astounding yields of the new varieties of wheat attracted Daya Mal

who raised a loan and on his small five acres sowed the Lerma Rojo seed. But nobody gave him any training or guidance. He did not apply chemical nutrients partly because of lack of money and partly because of lack of guidance and used the usual cowdung as fertilisers. Thus, he used a new seed without the new technology. After setting apart for domestic consumption he found that he had incurred a net cash loss.

Being a slightly tougher person he did not give in to his disaster and later on managed to find ways and means to improving the yields and income from his small farms. But recently the Department of Economics of Uttar Pradesh (Pantnagar) Agricultural University conducted a study and found that only 30% of small farmers who take to high yielding varieties in that area could look forward to the kind of success subsequently achieved by Daya Mal. Their finding is that some small farmers have got land which is too small and resources too little to enable them to make their farms viable. But there is another category of small farmers (who according to this study are 'potentially viable') who used chemical fertilizers, allocated at least 20% of their gross sown area to high-yielding varieties, produced reasonable yields and managed to sell approximately 35% of the crop. These farmers can be helped to earn net annual income from agriculture of approximately Rs. 1,000 to Rs, 1,500 provided they can be helped to grow two high-yeilding crops a year instead of one as at present. The moral is that right from the beginning a strong link should be forced between research and small farmers' training and development. Big farmers in this area were able to take advantage of training and are continuing to do so, but the small and marginal farmers were left out. Therefore, an attempt has to be made to identify small but potentially viable farmers in the area around the university. They should be formed into small groups. For each group of these farmers the university should undertake to provide special guidance in co-operation with the staff of the State Governments and assist them in procuring the required inputs. These farm researchers will of course have to be more careful in the field than in the

laboratory because failure could mean disaster for the small man.

Unfortunately, in U.P., the University and the Department of Agriculture are not functioning in earmarked areas of responsibility and even the transfer of the responsibility for conducting higher research to the University from the Department of Agriculture has not yet been completed. UP is a big State and one University may not be able to tackle all the problems of research. The sooner the problem is faced squarely, the better.

Government of India has recently endeavoured to give shape to the idea of the extension of the researchers' laboratory to the farmers' fields. A new scheme providing for national demonstrations *i.e.* demonstrations financed at the national level by the Government of India has been introduced in those 100 districts where the farmers' training programme initiated by the Extension Directorate of the Central Ministry of Agriculture is in operation. The arrangement is that the agricultural university nearest to the district nominates a small team of the scientists. The salary and allowances of these scientists are paid out of the funds provided by the Government of India. A number of private farms are selected for demonstration purposes. In these the results of research in the form of improved practices and technology are given a trial. It is the responsibility of the teams of scientists drawn from different disciplines, to give guidance to the individual farmers whose farms are chosen for the 'National Demonstrations'. At the same time, it has been arranged that the Farmers' Training Unit set up under the Farmers, Training Programme of the Extension Directorate but controlled by the State Government, would be responsible for organising the gatherings of the neighbouring farmers on the field days at the National Demonstration farms. At these field days, within sight of these neighbouring farmers various stages and aspects of new technology and practices are demonstrated and they are encouraged to put questions to scientists and to the Agriculture Department officials. National Demonstrations are thus an improvement on the sessions of farmers at fairs held in agricultural universities. The groups are small and

both the departmental officials (parepetetic teams, as they are called) and research scientists from agricultural universities can between them answer all kinds of queries. A follow-up of these gatherings is the formation of small farmers' groups. The group-idea attracts participating persons because of the hope that through groups they would subsequently get more information. Also the groups are being provided radio sets and audio-visual units. The group thus becomes the medium for more frequent and direct contacts with researchers. A two-way channel is established, the scientists speaking on the radio and answering questions that emerge from discussions held by farmers' groups after listening to weekly or by-weekly radio programmes. Where the distance from universities is too great for scientists to organise demonstrations, the local extension officers would initiate subsidiary demonstrations on the model of the national demonstrations.

Some informative material on the National Demonstrations scheme as run by the agricultural universities under the overall direction of IARI has been given in the appendix. The terms 'National Demonstration' is a semantic accident. It is only by chance that this word was used in order to distinguish the demonstrations laid out by scientists of universities with finances provided by the Centre, from those made by the extension staff of the State Governments with State funds. The latter demonstrations had in the past generally failed. Their technology was low and backward and supervision was unavoidably superficial because of the shortage of competent personnel. At that time the term National Demonstration began to be used for demonstrations which were guided by qualified teams of scientists with research to their credit and with their baseline in the nearest agricultural university. They were given facilities for giving guidance of a much higher level than could possibly be provided by the district extension staff. Moreover, the number of National Demonstration farms under each university team is much smaller and therefore the attention that they can give and the guidance that they can provide to farmers is also of a higher standard. However, it is to be hoped that gradually the distinction between National Demonstrations and

what are now known as subsidiary demonstrations would be narrowed and the subsidiary demonstrations, that is, demonstrations conducted by teams other than those that are based in agricultural universities would also reflect the latest adaptive research. Packages of practices should be similar and subsidies should either disappear or be on a uniform scale.

National Demonstrations or what I would prefer to call field demonstrations based upon research should no longer be confined only to those hundred districts where high-yielding variety seeds were introduced. When the farmers' training programme was drawn up some basis had to be found because the resources were just enough for less than one-third of the total number of districts in the country. Subsequently, when the National Demonstration scheme was formulated it was practicable to introduce it in those districts where the farmers' training projects had been in operation. Now, however, larger national considerations require that training based upon research should be available to other parts of the country. A new opportunity has recently appeared as a result of the decision of the Government of India to take up some priority programmes in neglected areas. In particular, the programmes meant for dry land farming, small farmers, marginal farmers, and water management are relevant to the link between training and research. All these projects have been sanctioned in the two years between 1969 and 1971 and the Government of India has provided substantial outlays on these. Recently, a programme for tribal area development has been formulated. In this the problems to be tackled are shifting cultivation, absence of land records, chronic indebtedness, want of communications, neglect of the resources of the forest etc. When these special programmes (viz Dryland Farming, Tribal Area Development, Small Farmers' Development Agency, Marginal Farmers, Water Management) were initially drawn up no specific provision was made for the training of beneficiaries. The Dryland Farming scheme is perhaps the only one with a built-in link with research. An earlier example had been available in a micro project at Anantpur—one of the driest areas in Andhra Pradesh.

With the help of French Agro-Scientists having experience of dry farming in West Africa, a small composite research-cum-development project was started. The fields—both at the Government farm and those belonging to private farmers—were used for demonstration and training. This example influenced the farming of the larger Dryland Farming project in the districts where the Indian Council of Agricultural Research had with Canadian assistance, decided to locate research sub-centres for dryland farming techniques in different situations. These sub-centres will thus become adaptive research and farmers' training centres.

A similar link between research and training has been attempted for water management projects at centres in the Tungabhandra "ayacut" (command area) region in Mysore, Azamgarh in U.P. and near Hissar (Haryana). The techniques of both dry farming and water management require the extension of the laboratory to the farm of the beneficiary. Marriage between research and training-cum-development was unavoidable. This cannot be said of the other recent schemes for small farmers and for marginal farmers and agricultural labour. These are much larger programmes covering 88 districts with an outlay of Rs. 115 crores. Neither adaptive research nor farmers' training was a built-in element in the schemes as they were originally drawn up. The principal element was credit and availability of inputs to selected farmers. But it would be fatal to imagine that credit and inputs un-accompanied by access to research and the institutional framework for training (demonstrations, field days, discussion groups and functional literacy) would sustain the small farmer for long. It was different with the better-off farmer, literate, and in a position to bear the shock of an occasional setback. Indeed in India research in small farms has been scanty. Japan's pattern of adaptive research centres seems well suited to the requirements of small farms. Every district with a small farmers' or marginal farmers' scheme should have an adaptive research unit at the same place where credit is disbursed and inputs provided. The adaptive research unit should have a link with the nearest university or research centre.

Cash crops are a main factor in the transformation of

subsistence agriculture into investment-oriented agriculture. The cash crops of black pepper and cotton back in the 10th and 17th centuries lured the merchants from the West. Later, it was jute and indigo. The character, volume and importance of investment-oriented crops has varied according to the markets which countries like India have had in the West. Industrialisation in the West initially was a greater booster for the cash crops in India. The Civil War in America was a boon for the cotton crop of India. But in recent years, other developing countries have become competitors. Also developed countries themselves have increasingly tended to become self-contained so far as cash crops are concerned. United States is quite understandably not at all keen on the development of cotton in India. Substitution of natural products by chemical products and plastics have also hit hard cash crops of India, particularly, jute, cotton and oil seeds. The way out of this dilemma is not simple, such as our being able to emerge as a major cereals exporter once our cereals production continues to maintain its present upward trend. It is research which has to come to rescue and to assume leadership. Excellent work has been done in the Coordinated Research Programme for Soyabean which is a source of proteins as well as high percentage oil. Improved varieties of groundnuts are also being introduced as part of the dry land farming programme. Sun flowers are now emerging as a commercial crop in the Himalayas and in certain other areas of the country. Sugarcane which had succeeded indigo as the main cash crop and in the early part of this century brought prosperity to many a part of the country, has had a varying fortune. In fact, some scientists have begun to feel that the expansion of sugarcane in Northern India did not take into account the severe winter in certain parts. According to these agricultural scientists, it is in mid-India and South India that sugarcane can prosper, the reason being that just at the time that the sap rises in the sugarcane stalk, there is in the northern States a drop in temperature which arrests the rising of the sap. Of course, some new varieties have during the last several decades been introduced and widely used. Nevertheless, the yield of sugar in northern

India is by and large less than that in Maharashtra and South India.

Sugarcane and all the other crops to which reference has been made in the foregoing paragraph call for not only intensive and quick research which is being done through all India coordinated research programmes of the ICAR, but also the extension of those results to the farmers. It is not all districts where these crops are growing. Under the Five Year Plan quite a few of these crops development schemes with substantial financial assistance from the Government of India have now been introduced. Large funds have been provided for subsidies, loans, staff, supervision etc. But it is doubtful if there has been distinct earmarking of funds for farmers' training and applied research. It would be a great pity if farmers' training and National Demonstrations scheme is not extended to districts where these cash commodities are being tried out with new practices based on research. Some are of short duration, some are high-yielders, some require less moistures, and for some new techniques of processing have to be adopted. All these matters call for training.

Since there is only one agricultural university in every State and since regional research centres are located at distant places, the full value of National Demonstration cannot be shared by all the areas in a State. Gradual removal of the distinction between National Demonstrations and subsidiary of the States is therefore necessary. The calibre of extension officers at the district level facilitate the multiplication of subsidiary demonstrations. But this alone will not do. It is important the university scientists and researchers responsible for guiding National Demonstrations should be encouraged to halt for the night in the village rather than rush back the same day. In one State tents are provided to scientists travelling to villages. These scientists go to the spot, pitch the tents, stay for two or three days, mix among farmers not only giving detailed guidance but also answering in detail questions and collecting information for local research. In other words, scientists will have to be prepared to function as touring officers and to put up with the inconveniences that go with this role. To drive fast at 60 m.p.h. quickly

give some directions and to rush back to the comfort of the headquarters or the security of their laboratory is not the way to win the confidence of farmers. Research in the physical sciences (research in agriculture as in geology and botany) calls for the movemet of scientists into the open, their exposure to the realities of a situation. Provision of tents to National Demonstration scientists might mean a little more initial expenditure. But it would also make scientists less dependent upon the hospitality of poor farmers. There is a worthy example in another department of government, the Department of Archeology. Archeologists tour out sometimes for months together working in what would appear to be rather primitive conditions, and yet being provided the basic amenities that would make them independent.

Even after providing these facilities to scientists communication with farmers would not be complete unless every district has its own centre for applied research. Earlier in this Chapter reference has been made to the prefecture level research-cum-training centres in Japan. I have had an opportunity to see a similar institution in Switzerland. Research centres at the local territorial level have been entrusted in Switzerland to cooperative organisations. Cooperatives provide credit, and custom service, insure crops and cattle. These cooperatives also maintain local research institutions in areas corresponding to Indian districts. I saw one such district during a recent visit. The research-cum-training centre run by the cooperatives had arrangements for testing fertilisers bought by farmers, as also their machinery, pesticides, cattle feeds etc. Laboratory methods are employed in examining various kinds of cattle feeds manufactured by companies. Some manufacturers seek technical advice on their products. These cooperative centres organise campus training also. Stipends are provided by the National Purchasing Federation. This body advances capital to cooperative societies for activities of a long term nature. The staff is highly qualified, some being of the level of Professors. Cooperative organisations also help farmers to prepare their own farm management plans. The training is given, of course, during the off-season, that is the height of winter when

there is snow all over and it is not possible to take up normal activities. These research centres located in the countryside are thus providing leadership to the Extension Department of the Government. The location of adaptive research centres in the districts is of more than symbolical significance for leadership. Though several agriculturai universities and some research centres have been located in rural areas, the location can sometimes remain but a gesture. University campuses are large, their environments are markedly academic. No wonder that they are far too august bodies for the smaller farmer to feel one with them. Their impact therefore has often been of the fall-out type. Through adaptive research centres, universities and research organisations can shed the walls. In an adaptive research centre the farmer is far more important. He is the starting point of research and investigation.

So far we have considered the capability of the research aspects of agricultural Universities and of Research Centres for adult education for farmers. What about their capability as educational bodies possessing instructional techniques ?

Recent experience of western countries shows that it is the long-term aspect of adult education which has generally engaged educational institutions. This aspect is concerned with the perennial need for the enrichment of the human personality. This is what has been given recently the name, 'Life-long Education' by Unesco's International Committee on Adult Education. In the implementation of this concept, educational institutions of all kinds have an important role to play both in the developed and devloping countries.

Farmers' training and literacy, however, would seem to belong to the 'emergency' aspect of adult education, *viz.*, that which becomes central and effective as a result of a crisis. According to Malcolm S. Knowles, the developmental process of adult education tends to be more episodic than constant ; it spurts in times of crisis. The crisis that challenges the developing countries is that of the inadequacy of skills for production related to economic development. The problem of poverty of these

countries is by no means new. What has produced the crisis, however, is first, the rapid increases in population and secondly, the urgent environment of increased production and development, the pressure for a quick explotation of resources.

This crisis has given a new validity to those programmes of adult education which would promote the requisite skills among the large masses of people who are to be mobilised for programmes of economic development. Literacy is also one of the most crucial skills that these people need today.

Can educational institutions play a role in this "emergency" aspect of adult education ? The Education Commission of India envisaged for schools and colleges a special responsibility for what it has called the 'mass approach' to literacy. It argued that the main brunt of the campaign for making millions literate through voluntary service, should fall on the teachers and students, schools and colleges and recommended that they should be required to teach adults as a part of their compulsory national service which the Commission has proposed. It even asked for relief being given to teachers from school work by remunerating them for adult literacy work. The Commission thinks that the schools 'will need to be transformed from a children's school to a people's school.'

Experience of the use of general schools and colleges in literacy programmes of this kind in the past has been rather uneven. But so far as vocational and specialised educational institutions are concerned, these recommendations are more meaningful. In particular, agricultural colleges and institutions can and should welcome these proposals, because adult education for them means farmer's training. In the training of farmers for production purposes, agricultural schools, colleges and universities have to make a distinctive contribution. Professional institutions particularly those concerned with agricultural training have, in respect of adult education, an advantage over institutions for general education.

In the very nature of things professional or vocational education is an adult experience. The motivation here,

for a young person who attend the course is one of building a professional career. The preparation for life in agricultural institutions is a more specific preparation. This specificity results in emphasis upon the courses and tasks that are practical and relevant to direct needs. This does not mean that agricultural institutions should intellectually be of a lower level. It only means that they are marked by an adult and purposive approach to the process of receiving and analysing knowledge. It also means that the process of education is closely related to demonstrations of a practical kind. Moreover these institutions are better equipped to understand adult psychology. If an agricultural institution is thoughtfully planned no adult farmer would feel odd in its class-rooms or farm. He would not be bothered with the contrast between the school and work environment. This contrast inhibits the average adult in regard to a general institution.

In other words agricultural schools and colleges can provide what may be called 'specialised adult education'. I prefer this term to the 'selective approach to adult education'. The words selective approach give the impression that certain people are to be left out. But specialised adult education is the counter-part of vocational institutional education. It is true that modern institutional education seeks to break the barriers of specialisation. But the very specialised character of agricultural (and industrial) institutions is an asset for adult education, an asset which the general educational institutions lack.

There is another reason why agricultural institutions in the developing countries have a greater chance of playing an active role in the adult education movement. The obvious lesson which the great adventure of the Community Development movement has for India is that it is not enough to provide an administrative net-work for rural areas (which incidentally is one of the lasting and important results of Community Development). What we then missed, is the radiating point of reference for extension and training to farmers. We tried to build our Block headquarters into 'centres of light'. But they have turned out to be not very different from other Government offices. The environment is not conducive to

education and interchange of thoughts and experience on a footing of equality. Perhaps the history of the Community Development movement might have been in some respects very different if the 'base-line' for extension operations (quite apart from the rural administrative services) were to be agricultural or rural institutions. The points of radiation for information of the farmers could perhaps have been a chain of agricultural schools, colleges and universities dotted all over the countryside.

It should be possible to strengthen extension activities among farmers by using the expert staff of agricultural schools and colleges for advice and training and their facilities and equipment for providing service. The number of agricultural schools, colleges and universities in India is going to increase. Even though they cannot take over countrywide agricultural extension, each can accept the responsibility for the surrounding villages, and in so doing it can organize adult education for the farmers. Already a beginning has been made of such extension programmes by some agricultural institutions, depending upon the extent to which they have given a production-orientation to their academic outlook and methods. Without this emphasis upon production, and without a link-up with specific production programmes being launched by Government, agricultural institutions would not be able to elicit response from farmers.

Assuming that as a result of the two circumstances described above (namely, the 'adult' character of agricultural education, and its potential for extension work among farmers), agricultural schools, colleges etc., can be more dynamic in the voluntary literacy effort envisaged by Indian Education Commission, what is the kind of literacy in imparting which these institutions can be more effective ? The Unesco definition of literacy considers a person literate who can with understanding both read and write a short and simple statement on his everyday life. This is an excellent basic definition. But it refers neither to the specific needs of an 'emergency' such as a community's urgent task of increasing production, nor to the special basis of the process of enabling the adult to achieve the desired level. The concept of 'functional

literacy' takes both these factors into account. Functional literacy calls for (*a*) a level in the skills of reading, writing and arithmetic that would enable the neo-literate to apply these skill to his function or vocation in life, and (*b*) an adjustment of the process of imparting literacy itself, so that from the very beginning of the lessons, a link is established between literacy and job requirements.

Of these two requirements, the former concerns the 'end product', while the latter constitutes what, decades ago Mahatma Gandhi had advocated for the child, as 'basic education'. Experience has shown that basic education for children did not succeed to the extent expected partly because it had to balance correlation of work with the need of play for child-expression. The problem is different with the adult. Correlation for an adult engaged in a serious job is an obvious method of involving him in the task of learning. The motivation is immediate since the results of achievement are concrete and advantageous to the learner. Therefore, it is important that the process of functional literacy for the farmer must be designed in graduated phases, each phase leading to some kind of application of even the partially achieved skill to a job. This is going to be a challenge to the pedagogist. But the challenge cannot be met in the exclusive environment of a pedagogical laboratory. The mechanism of correlation for functional literacy for farmers can only be forged in agricultural universities and colleges which, for this purpose, should be provided the support and facilities of pedagogy. (See chapter on Androgogics)

The above proposal implies that primers, text books and reading material as hitherto understood may have to be replaced, by specific and specially prepared material, sometimes even varying according to the local situations, crops and the production programme. There is no royal road to literacy, at least none for functional literacy. Reading material and the curriculum have inevitably to be flexible and sometimes, even *ad hoc*. It is thus that literacy can be an ingredient of the production programme. The very novelty and complexity of functional literacy for farmers establish the special role of agricultural institutions. General literacy drives can operate through the

mobilization of individual volunteers and of simple organizations and institutions. But a programme of functional literacy is more sophisticated though no less urgent, and it is agricultural schools, colleges and universities that have to take the initiative and provide the sustaining spirit and resources. For this they are (and can be) better equipped than government departmental offices or the general type of voluntary organisations. They have their own farms, cattle and stocks of inputs. They are expected to have staff with both modern theoretical and practical background. They have, in some cases, modern equipment for ploughing, application of fertilizers and pesticides, processing of seeds, testing of soils etc. Above all most of the agricultural institutions are expected to be located in farm environments, with easy access to the practising farmer whose queries they should be able to answer and with whom they should be able to establish a more intimate relationship on a footing of equality as between two fellow-professionals.

In the organisation of functional literacy (as a basic element in agricultural extension work) one can visualize four responsibilities to be discharged by agricultural institutions located in rural areas. First, they should analyse the basic and immediate requirements of the participating farmers in terms of literacy use and prepare the syllabus and reading material on that basis. For example, the High-Yielding crops programme in India calls for a time-table for every individual farmer, simple accounts book for supplies and credit and simple correspondence with the governmental and cooperative agencies. An agricultural institution should for the specific programme in its local area, do some elementary research on the programme and compile lessons related to these requirements. This task of analysis and compilation will be continuous and can only be adequately discharged by staff that has practical experience of improved agriculture and has at the same time a leavening of educational psychology and methods.

Secondly, agricultural institutions will arrange for training of the instructors and the supervisory staff of the farmers' literacy programme. These instructors will be

operating in the interior of the countryside often, individually and without the usual paraphernalia of a school Therefore, their training would seek to make them self reliant for meeting the situation and problems as may arise from time to time. Functional literacy being a complex operation training and trials are an inescapable preliminary for it. It is obvious that training will be more than in pedagogy; it has to grow out of agricultural practices.

In the third place agricultural educational institutions located in the rural areas should function as the 'baseline' for the literacy programme for farmers in the territory around them. It may be a district or it may be a block but it is important that the headquarters of the literacy operations for farmers are located on the campus of an agricultural education institution. It is possible that this institution may take the form of Farmers' Institute as distinguished from an agricultural school or college for the young people. In that case it must have its own farms and laboratories. Should that not be possible the Farmers' Institute may be located in the campus of an agricultural college, university or school. At these headquarters a number of part-time or whole-time residential courses for farmers may be conducted with an element of literacy in it. The Farmers' Institute may also maintain peripatetic teams of specialists going out to the centres where individual instructors would be operating and conducting training camps. These institutes will also be the headquarters for groups of neo-literate farmers and farm women, with whom a continuous and living contact through correspondence may be established. They will maintain a bureau for answering questions and supplying informations. They will also be related to radio programmes. In other words Farmers, Institutes will be like *alma maters* for neo-literate farmers of the neighbourhood to whom they can turn for guidance and advice from time to time.

Finally the role of agricultural institutions in literacy for farmers can be strengthened if they share with Government the responsibility for providing certain essential services to the neo-literate farmers of the neighbourhood.

These services may take the form of soil testing, providing on rent power tillers and tractors, arrangement for seed processing, helping in the repairs of tools and implements and rendering advice about marketing, packing etc. These services may not strictly be part of the literacy programme. But they would not only offer an attraction to the illiterate and an invitation to him to become literate, they will also be a process of follow-up education for the neo-literates. Literacy cannot be parcelled out into rigid camps and compartments. It has a certain fluidity about it which may mean relapse into illiteracy unless steps for follow-up are taken by those from organisations and persons who are engaged in the task of imparting literacy.

Whatever has been said above regarding agricultural educational institutions applies with greater force and pertinence to those among them which fall in the category of training institutions for agricultural extension officers and workers such as District Agricultural Officers, Agricultural Extension Organizers, Village Level Workers, Animal Husbandry Organisers etc. Indeed these institutions have to lead the way because their trainees are already involved in agricultural production programmes.

The role of agricultural educational institutions in mass literacy arises from the complex nature of functional literacy for farmers ; it cannot materialise without an adequate appreciation of the interrelationship between adult education and those departments of Government and other organisations which are responsible for launching and supervising agricultural production. Nothing would be more detrimental to the progress of adult education than the growth of agricultural educational institutions as citadels of academic and theoretical knowledge. Even the jealously guarded autonomy of educational institutions will have to make a compromise when it comes to production programmes and extension work. Educational institutions and Government departments and organisations have to go together hand in hand without suspicions and hostility. There is no alternative to team-work.

10

A World University for Farmers

Recently, an idea was put forward that the United Nations should take the initiative in setting up a World University with the object of promoting better understanding among people, better knowledge of each other's progress and a situation in which wars become unnecessary. As usual, the concept of the University has been initiated at an intellectual level and the emphasis is upon getting together academics of the highest standard who know how best to utilise the finest minds and promising young people of the world in promoting a body of men and an intellectual environment that is characteristic of a university.

Naturally, doubts have been expressed if a University of this kind would not be practically a duplication of centres of higher education that have grown over the centuries in different parts of the world and that also in their own way promote the concept of one world and the ideals of harmonious spirit among human beings. There are exceptions like South Africa and Portuguese colonies where the equality of human races has not been recognised, but by and large this is the role which Universities in all member countries of the United Nations seek to play. What then can a new university or a new international centre of academics achieve ? Is it necessary to have an Institution of this kind ?

In my opinion, there would be justification for a new enterprise of this kind if it is not one meant mainly for enabling the academics and intellectuals to have more opportunities of contact with each other and to get together persons who are already converted to the ideology of one world. Instead what we need to do is to improve the economic condition and the intellectual equipment of

the common men who constitute the majority of the world for whom the United Nations exists in the ultimate. Most of these common men are farmers. Many adult farmers exist on a subsistence level in villages, some still in the middle and even primitive ages, while the science upon which their own occupation is based, is making rapid strides.

The suggestion, therefore, is that there should be a departure from the traditional concept of a University or a college with a campus where intellectuals gather, do research and impart information and knowledge to each other. Instead, the United Nations and its specialised agencies and some of its comparatively affluent members should find funds in order to create an Institution that may not necessarily have its own campus and may be able to manage with a small staff. But this would be the university of Life-long Learning for farmers. This Institution which may be called the World University for Farmers should have of course specialists of the highest order from different parts of the world so that the agricultural needs of the different regions can be represented. This widely scattered faculty of the University should be consulting each other off and on, should be receiving information from all over the world and should conduct at the same time a service in the form of correspondence in different parts of the world. In so doing, it would not necessarily have its own campus. Instead, it may have its own representatives, academic bodies of the agricultural universities of the world and advanced colleges and centres of research. At the same time it may suitably involve in a partnership status the radio and T.V. stations, museums and exhibitions that are engaged at present in imparting information on the latest techniques to the farmers. Of course apart from a small administrative and organisational office it may also call sometimes meetings of an academic federation of such selected institutions from different parts of the World devoted to farmers and farmers' institutions engaged in training and education.

It will, therefore, be a university of a very different kind from the kinds that have developed at national

levels over the countries. It will, however, be nearer the concept of the Open University which is at present being discussed in different parts of the world and particularly in Great Britain.

The students of this University will have to be those who are engaged in guiding or performing actual agricultural activities based upon modern Technology and Sciences and wish to have more information every month not in order to get any degrees but in order to keep themselves well informed of the latest developments and also to participate in some of the research programmes which require high level experiments on private farmers' fields rather than in laboratories only. They may of course also include fishermen, and those who rear cattle and sheep and poultry, etc. There will be no compulsion but an attempt will be made to enrol them and to charge the minimum of fees. In return for whatever enrolment fees are charged from those students of a unique World University of Farmers, they will be supplied material in the form of extracts of books, brochures, pictures and other materials.

Its faculty would include not only experts as suggested but also men who know the languages of the students from some other parts of the world. They will render into the languages of the students the material that is of value to them. This material will of course be often specially prepared for diverse specialised disciplines. It will almost be custom tailored, answering the queries of and providing the clarifications for the sake of farmer students from different parts of the world. These farmers will thus become participants in a process of learning that is never going to stop. It will be a university which will not provide terminal courses as in traditional young people's Universities and degree-giving colleges nor may it have ceremonials at the end of which degrees and diplomas are awarded. Instead it will be a university of Life-long learning which will enable the farmer to continue to participate in the latest techniques that are being developed all over the world from month to month.

The reason for having such a university of farmers is that today some of the most modern information on the

techniques of agriculture and fisheries etc., are being published only in languages like English, French and Russian. Very little is being published in the languages of the Eastern countries. Therefore, though the United Nations and its specialised agencies are supposed to be a world organisation, they have not been able truly to inform (with a few minor valiant exceptions) the large majority of human beings who belong to the most important and vital profession in the world's economy, that is, farming, fishery, cattle breeding, etc. Since the proposed World University will not only operate through the national level universities but also involve radio and T.V. organisations, museums and the village libraries (of which a complete list will be kept), it will not be necessary for it invariably to have direct and personal contact with every student, though such contacts will not be ruled out.

This can be done by promoting a system of giving guidance sometimes by means of correspondence, and often through bulletins and circulars issued to the members of the Academic Federation of World University who can, keeping local condition and needs in mind, communicate with the farmer students and use certain tested methods.

These methods have been discussed elsewhere more than once. The most important method is of course demonstrations on the farms of selected farmers. But not less is that of supplying information on radio, TV, videotaperecorder, super 8 mm films, reading material in local languages, and museums, etc.

Encouragement to the formation of small groups of farmers by the students of World University may be another possibility. A student of World University can thus have a special 'academic' function to perform, that is to say, to run a small group of his own where he might discuss the information that is made available to him from the World University's affiliated bodies.

Why is a World Centre like the proposed University necessary? Because, particularly for the developing countries, new problems are arising, problems that have a common significance for other parts of the world.

Countries in Latin America have got difficulties similar to those of South India. It is true also of South East Asia and certain other parts of the world. There are undoubtedly some useful organisations such as the Bureau of Commonwealth in London. But these are confined to high level researchers and scientists who already have plenty of opportunities through a number of Foundations and Universities to meet each other and to exchange ideas. But, what can the United Nations and its specialized agencies do for the common man ? Therefore, if there is to be a World University, it might be better to strike a new line. Any special funds that are created should be made available for an organisation of the kind visualised above for the benefit of the common man in rural areas all over the world.

It is true, however, that a university is not merely concerned with professions and means of living. It is a place for the enrichment of the mind and taste. Such enrichment of the mind has undoubtedly depended to a great extent upon the economic conditions of the people. But if there is to be a World University that will involve selected farm leaders from different parts of the world and particularly from the developing world, then once its bonafides have been established among these farming communities as a means of bringing within their access the latest information about farming and once the local universities, radio, TV and other bodies that will be associates or parts of this World University are able to give appropriate guidance to the adult farmer-learners, then it will not be difficult for the World University to utilise these contacts for promoting the folk and traditional heritage of these communities. There may be different points of view about whether or not the folk and traditional heritage of the rural communities are going to survive. Perhaps, this is partly based upon an impression that what are now seen as the folk and traditional cultural forms, whether performed at plays or ballets, etc., are old unchanged and unchangeable. In fact, if they are studied carefully it would be found that they have always responded to change though this change may sometimes seem to be slow. They have often reflected the anguish and pleasures of the masses as

well as significant (though often overlooked) events and the changing modes of life and attitudes. A close study of the traditional drama, for instance, or of the traditional ballet would indicate over a period some interesting changes in the ways of communication by them. Very recently a ballet singer came to Delhi and gave a wonderful performance about the famous scene in the Mahabharata in which Arjun is exhorted upon by Krishna toengage himself in the battle. This Shri Krishna used a remarkably picturesque expression to the effect that there has been a "small puncture in the mind of Arjuna and that is why he is so depressed and tries to give reasons in favour of inactivity". This of course was only a linguistic and communicational change. But studies have disclosed material changes over centuries. Therefore, it will not be right to imagine that the folk and traditional culture of communities are bound to be swept away by the city civilization all over the world. It is of course true that never before in history, were villages subjected to the steam roller of mass media with their thoughtlessly crude taste and with scanty regard for the response or participation by the rural people. But the point is that whether it is for the urban people or the rural people, life has a meaning if apart from professions and vocations some sort of leisure time, cultural participation by people in various kinds of activities is possible. Technology brings both more work-pressures and more leisure. In fact, recently in Germany many employers have discovered that they can get better performance from their staff if during the tea interval they arrange for community dances. The proposed World University should not therefore fight shy of not only studying folk and traditional forms which has of course been done more than once by able scholars but also encouraging adult learners to continue those community activities even though often threatened by city entertainment. It is thus that the proposed World University would become a true centre of learning by the masses of the developing world. Adult Education for farmers would also reach its point of culmination as well as worldwide recognition if there could be such a possibility.

A World University for farmers cannot come into being unless there is a realisation on the part of the world financing agencies that the training of farmers all over the world particularly in the food deficient countries is an international responsibility. From time to time pleas have been made for raising the assistance of aid to 1% of the national income of the affluent countries. This has come about only in a few cases. Partly this is because in spite of World War II, many affluent countries continue to spend a considerable amount of their national incomes on war industry. Nevertheless, the new attitude of bodies like the International Bank for Reconstruction and Development (IBRD) and the newly formed regional banks (e.g. Asian Bank) and the new Consortium for Assistance in agricultural research in which a number of multilateral and bilateral bodies have participated, gives rise to some hope. Discussions held on this subject in some countries indicate that the academic people feel that financing agencies should spend money only on higher research, leaving the extension work to national resources. National governments of developing countries have to find resources for building up inputs industries for the improvement of agriculture. These projects of theirs, therefore, have marginal provision, if any, for the education of farmers, factory workers, fishermen, etc. At present the World Bank (IBRD) gives loans for some of the agricultural projects but in very few of these is there an element and provision for farmers' training. Since IBRD has had more than one experience of some of its excellent schemes failing for want of extension and training, it would be wise for them to assist such developing countries with funds for the training of farmers. This they can operate through the proposed World University of Farmers.

It is true that a number of projects have provided for what has been called communication. But in the eyes of the farmers in the developing countries the distinction between communication and extension and training is not very clear. Therefore, economic aid projects should have provisions for these facilities, with considerably closer spelling out of the proposed operations in these fields.

Another role which the World University for farming can perform is to assist through correspondence courses as well as through guidance to teachers' training colleges and universities the training of the village teacher in the new technology of agriculture. This very university can also undertake research on various kinds of audio-visual techniques which can be used by farmers in developing countries in their own situation on their small holdings.

Moreover, the World University should be able to promote the publication either of special columns in national and local newspapers or of special newspapers for farmers in the developing countries by providing them facilities in the form of paper, etc.

Finally, as I have stated above, a World University of Farmers has to be a source for Life-Long Learning. It will, therefore, be necessary for the World University to identify the items of Life-Long Learning through which it can continue to give guidance to its alumni even afterwards. Examples are (*a*) academic field : bulletins and correspondence, (*b*) economic field : national banks continuing to give loans to farmers, etc., manufacturers and distributors of various kinds of inputs for various economic activity ; (*c*) social field : traditional rituals, institutions, social clubs in small towns and other manifestations of community life, theatres and community entertainment; and (*d*) TV and Radio, and films-strips, Video recorders, etc.

11

The Role of Voluntary Organisations

Have non-governmental or voluntary organisations special capability for adult education for farmers ? The experience of most European countries particularly the Scandinavian group, Denmark, Sweden and Norway, and of Japan shows that cooperative societies of farmers, fishermen etc., are the most efficient agencies for the training of primary producers largely because they combine this function with that of supplying inputs, providing customs services (for anti-pest operations for land development and machines etc) and in many cases, with the purchase and marketing of farmers' produce.

In those countries, the strength of the cooperatives lies also in the efficient management cadre, though voluntary. The cooperative societies take care to employ wholetime paid staff. This staff has the competence to organise training facilities for farmers, to act as intermediaries between farmers and agricultural specialists. Their own proficiency in credit matters enables them to help farmers in understanding and interpreting credit programmes. The society thus is a primary training group for all member farmers and not merely for those who are office bearers.

Japan offers perhaps the best example of how in a populous country with small holdings and in the context of a transition from landlordism and semi-feudal practices to individual ownership by small farmers engaged in intensive and mixed farming, the cooperative organisations have emerged as the sheet anchor of a burgeoning agricultural economy. The leadership to farmers is provided by the cooperatives. A Unit cooperative has usually a large membership, of nearly 6,000 members. It has generally six departments and covers credit, custom services, supplies, marketing, life-insurance and leadership. Some have special department for feed development.

An important function of the Unit cooperatives is to help every member-farmer prepare his Farm Plan. This process is indirectly a kind of training in farm-management and is the basis of the farmers' operation in all stages. The cooperative has a specific interest in the preparation of a sound and accurate farm plan for that is the basis of its calculations of the year-long transactions of supplies, marketing, and projections, of imports of raw material (*e.g.* maize for the manufacture of feeds) and exports of the farmers' produce. Mutual self-interest is at the root of the learning process.

A number of Unit cooperatives are affiliated to the prefecture-level centre which is run by the association of the cooperative Units of the prefecture. The centre is also a kind of a branch of the National Purchasing Federation of Agricultural Cooperative Association ("ZENKOREN" in short). It is often a combination of technical service, adaptive research and training. The adaptive research institute has a link with the national level research institutes and with government's district extension staff.

Thus the centre because of its composite character and because it offers within easy access of most farmers several facilities, is able to perform more than one kind of training to groups and individual members of the cooperatives. Every centre normally has laboratories for the testing of chemicals (pesticides), fertilizers, food products, feeds, and machinery and certifying them for farmers' use. When field problems are reported these laboratories may try to tackle them initially. If they fail owing to the complexity of the problem, they would refer the matter along with necessary technical details to the national research institute. The laboratory of the Centre creates a learning environment for the farmers of the prefecture.

Several courses for young farmers are conducted at the Centres. A popular course is that on repairs of agricultural machinery. Considering the importance of innovation in machinery suitable for small farmers, the Centre has also usually an exhibition of latest implements and devices. The Centre also maintains machinery in common use. Thus 20 farmers may share a large rice-thresher kept at the Centre. Since cooperative Units also

sell consumer goods and T.V., sets, prefecture centre may run courses on repair and maintenance of T.V., sets or other complex machinery for consumer use.

Capital and loans for much of the equipment and other needs are provided by the National Federation (Zenkoren). There were in 1970 two cooperative federations at the national level one for marketing and another for purchases,—but there was a talk of their merger.

What stands in the way of a country like India having the cooperative system play a central role in agricultural development and training ? India has a National Cooperative Federation with sizeable funds for new projects provided by government. It has also a National Agricultural Marketing Federation. The number of cooperative societies has gone up also.

One of the principal reasons for the uneven role of the cooperative structure in agricultural development has been that the private money-lender and the private food trade are both deeply and traditionally entrenched in the countryside. They constitute an all pervasive and often elusive vested interest against the cooperatives getting into strides. Moreover after independence with the abolition of Zemindaris and tenure-holders (intermediaries between tenants and governments), many of these intermediaries owning large personal lands found it advantageous to form cooperatives with the minimum required membership consisting mainly of their agnates and relatives : these 'cooperatives' readily grabbed the liberal assistance and loans that governments in free India, keen to develop the cooperative movement, offered. Again the growth of the cooperative movement in India since 1905 had been blighted by fragmental approach at the Unit-level. First there were only the Credit cooperatives which in a static agricultural economy, only encouraged diversion of agricultural loans into other domestic uses and ceremonials. Recoveries in a rigorous way scared the peasantry and eventually the very word cooperative was identified with a relentless mechanism to deprive the debtor of his property and belongings in lieu of arears. Sugarcane cooperatives started well, but soon in many parts of the country they became citadels of local political power.

Office-bearers used the society funds and position for building their position in local Panchayat institutions and in the election tactics for state legislatures. Consumer cooperatives have mostly drifted into uneconomic operations, their losses becoming a headache for governments. Market cooperatives, joint farming cooperatives, forestry cooperatives all have run their course and because of their limited fragmentary character and want of adequate operational links with sister bodies, they have often become sorry spectacles of inefficiency and corruption.

Not that the cooperative movement all over India has had such fate. On the contrary there are outstanding examples of successes particularly in Maharashtra, Gujarat and parts of Mysore and Tamilnad. Perhaps the best results have been obtained wherever cooperatives were developed in response to a new market for commodities that could be produced by members. Thus the highly efficient and famous network of Milk cooperatives in the Kaira district of Gujarat at Anand, owes its phenomenal growth to the assured and growing market for milk and milk products in Bombay and later in the armed forces. The Kaira cooperatives are also excellent examples of multipurpose functioning at the Unit-level backed by a meticulous system and unmistakable business lines on which the apex organisation is run. The multipurpose role also accounts for the success of outstanding cooperative organisations such as the one in Uruli-kanchan in Maharashtra and Mandya in Mysore. In the former it is the missionary spirit of the leadership and in the latter the business acumen that have sustained the cooperatives.

These and other successful cooperative institutions in the country have played a distinct role in educating their members on both the occupational and the business sides. Organised training has in India been, mostly confined to the executives of the cooperatives and the personnel employed by Government in promoting the cooperative movement. Most of the courses have been organised directly or indirectly at the instance of the National Cooperative Development Corporation and under a number of schemes of the cooperative department. Few training programmes for the personnel are run wholly by

cooperative institutions themselves out of their earnings. One of the exceptions is the Kaira District Milk Cooperative Union which in most respects is comparable to some of the best cooperative agencies in the world.

However the overall picture is of a government dominated cooperative movement showing only occasional and rather rare signs of local initiative. Does it mean that the cooperative movement has an uncertain if not a dismal future in India? There are strong reasons to believe that this would be an unjustifiably pessimistic outlook. As the 'Green Revolution' spread to the small farms, fishermen, poultry men and milk producers etc., the need for organisations getting them together would grow. But what India seems to need today is a crop of 'transitional' organisations. These can be associations of areas, institutions and occupations. These associations will have to be more flexible than cooperatives, more accommodating to the small men, more bold in trusting farmers and in planning and implementing investment programmes. They will be more rooted to the soils. All this they can be if their organisations could be undertaken by voluntary institutions inspired by ideology and dedicated to the service and progress of the people.

Let us examine the background of such voluntary institutions in the country and how in recent years they seem to be making a decisive entry in the agricultural field. One of the manifestations of the revolution in Indian agriculture has been the new role of voluntary organisations as agencies for organising production-cum-training programme on the field. This is a role of far reaching significance in the process of communication with and training of farmers and primary producers of agricultural commodities. In order to understand the significance of this role, it is necessary to identify objectively the characteristics of voluntary organisations for rural development and training during the Gandhian phase of India's recent history and also to see how those characteristics have had to undergo change under the pressure of necessity.

Though during the Gandhian phase most voluntary organisations worked with the object to bring about

overall development in the rural areas, few of those organisations were concerned with agricultural technology. The tendency was to regard agriculture as a way of life and as a subsistence activity for the poor people that could not support them and had therefore to be supplemented by cottage industries and homecrafts. In that stage of agricultural technology, the concept of investment-oriented agriculture seemed to be remote and unpractical.

Gandhian ideology also emphasised the duty of the better off people towards the have-nots. In a sense it was essentially an elite approach to the villagers, *i.e.*, one based upon helping the villager from above, passing on to him new ideas and working among them in a spirit of self-sacrifice. Thus the duty of the educated among the Indians was to impart education to the illiterates, the duty of the caste people to uplift the Harijans. The poor and the denied were hardly in a position to help themselves. Not much attention was given to organise them for this purpose. It was paradoxically enough not a self-help ideology. One other circumstance is relevant. While Mahatma Gandhi trained constructive workers at the Ashrama, every mass movement that he initiated meant a suspension of the constructive activities and often when he resumed them in the intervals between two movements he would even begin afresh at an altogether different campus.

Between Mahatma Gandhi the teacher-communicator and Mahatma Gandhi the leader-communicator there is a clear distinction that was often blurred by this sequence. Struggle (against this British), followed by internal constructive activities, thereafter again struggle. Without observing this sequence most people could see only one aspect of his communication process *i.e.*, as the patriotic leader who mobilized rural masses into non-violent action that baffled the British Government. This mobilization was done through massive public meetings, through marches led by the Mahatma, through fasts and similar other acts that dramatized situation and enabled him to communicate with the the people at one stroke, as it were. The other role of the Mahatma as the teacher-communicator was very different. The process there was specific, attention was given to details,

instructions were clear cut and meant to be acted upon. The organisations and agencies set up for implementation were functional, with precise rules. Communication was directed towards individuals engaged in specific activities. The collected works of the Mahatma are full of guidelines on such diverse matters as the ideal way of travelling III Class, use of human refuse as organic manure, nature cure for common ailments, how to write the diary, nutritious food etc.

As teacher-communicator, Gandhiji devised the Basic System of Education for children. The theory of Basic education is based upon the correlation between the learner's mind and hands. Work such as spinning, weaving and kitchen gardening provided opportunities to the teachers to lead his pupils on to arithmetic, reading, writing, geometry, economics, geography etc. But this technique was not adopted in the area where it had logically far better chances of success, namely, the education of adults. Had the programme of adult education attempted in Gandhiji's life-time primarily as a literacy campaign, been based upon the theory of correlation the training of adult farmers would have been part and parcel of a movement towards better agriculture and higher incomes for the farmer.

In this role, Gandhiji set up a number of voluntary institutions on a national basis such as the all-India Charkha Sangh and the Hindustani Talimi Sangh. No organisation was formed for farmers only and the field was left to some left-wing parties to develop organisations of the Trade Union type to conduct struggles regarding land reforms. During the years immediately following Independence, these Gandhian organisations went into the doldrums and most constructive workers found an escape in the pada-yatra missions of Acharya Vinoba Bhave. They got out of touch with the change that was coming over the country-side and were disillusioned to see that some of their oft repeated theories such as exclusive use of organic manure were being upset.

The above analysis of the voluntary institutions during the Gandhian phase is not meant to be a criticism but essentially the analysis of a historical phenomena. What is more important for today's worker is to spot those

aspects of the Gandhian approach that are relevant today. Of these the most important seems to be not to approach rural development and the question of the training of the rural people through a pre-determined process based upon sociological types and even economic behaviorism. Typology and sociological and economic principles should follow evaluation and analysis. The Gandhian approach was primarily a pragmatic approach based upon the exigencies and demands of the situation.

Indeed the worker has to base his programme upon the needs of the *moment* and the *situation*. By the moment is meant a specific set of circumstances that can generate the process of development. By 'situation' is meant the identification of specific problems in a particular local area and to look for a workable solution of those problems. Thus the Gandhian action is not so much a long range plan of action, but a time-bound programme of activities. This unquestionably brings the workers to grips with a local situation as against his pre-occupation with theories and inferences. This pragmatic approach has to be demonstrated increasingly in specific situations because otherwise the Gandhian workers runs the risk of being inundated with theoretical premises.

Historically one can date the revival of the role of the constructive Gandhian worker to the years following the Bihar drought of 1966-67. Until then the Gandhian type of field constructive activities had been at a discount in Free India and the Gandhian worker had been elipsed for various reasons. Outside the Gandhian circles there were two kinds of voluntary organisations. One, the Missions, that were concerned with charity. Most of these are Christian missions though there are others too like the Ramakrishna Mission and the Marwari Relief Society. The second category of organisations were the centre-based, 'umbrella' type of organisations. Their centre would be at the capital and they would be concerned with a large number of activities for which they were themselves not directly responsible. Some of them sought to build up pyramids from the top which in its turn led to a structure not very different from that of Government organisations.

What were the factors that led in India to the appear-

ance of a different kind of voluntary organisations? It was not merely the result of the Bihar drought though that did lead to some heart-searching. It appears that the experience of the Community Development programme made people wary of the so-called community action in the name of which a new kind of middle-man began to operate. Community Development action led sometimes to the emergence of village contractors, most of whom were former petty zamindars or their gomashtas. These people, already in power in the counteryside became even more powerful and were able to continue their influential position. They got rich by building culverts, block-buildings, village roads etc., in the name of the village community. The small man had thus nobody to guide him and help him but many more to exploit him.

Another inadequacy of the C. D, programme in the fifties was that the Village Level Worker turned out to be a generalist extension agent who could not command the confidence of the farmer for want of specific expertise. The inadequacy of the generalist type of extension agent became even more apparent as agricultural technology grew more complex.

Thirdly, the small farmer felt even more left out when the new technology of the high yielding varieties programme in certain parts of the country lent urgency to input availability and increased the volume of the inputs, credit needs, etc. There was no agency that could put the small farmer into touch with the authorities that would provide inputs and meet his credit needs. Again, tardiness in the implementation of land reforms resulted in the identification of the better-off farmers with local political power while the small cultivators found access to inputs denied to him ; the first preference for credit continued to be given to documentary evidence of ownership over land or giving it on mortagage in order to obtain loans etc.

In this environment the Gandhian type of dedicated social worker was eclipsed by the politically influential *novo rich*. It was the latter who could command resources for arranging visits of political superiors. No wonder that in the mid-sixties the necessity for new or transformed

voluntary field organisations was felt. Such organisations devoted particularly to agricultural production and connected activities have been in operation for the last 5 or 6 years in India. It is possible to analyse the factors that make them effective. These characteristics may not necessarily be shared by all these organisations, but they are the 'infrastructure' upon which the framework seems to have been built.

These voluntary field organisations seem to succeed because they operate in small, compact, local, rural areas rather than seek to develop a programme in a dispersed way over a large region or zone. The compact operations enable them to keep activities under proper control and review. Quite a few of these are societies registered under the 1861 Act which enable them to seek exemption from the levy of income tax on their funds. Generally, there is resistance to forming cooperatives except in those parts of the country where traditionally cooperatives have succeeded.

What is the kind of programme that they prefer ? Generally these are programmes of promotion of agricultural development blended with the training of prospective beneficiaries through participational groups. In other words, they do not aim at increasing production on the basis of target-fulfilment. Nor do they think in terms of having short courses of training that do not arise from production activities. The training itself seeks to serve the production needs and it does so through field agencies of small groups of beneficiaries.

These new constructive voluntary organisations depend for their resources and funds not so much on Government but upon various non-Governmental organisations, including those from foreign countries, and also industrial and manufacturing firms in India. In this respect these organisations have benefited from their association with the Freedom From Hunger Campaign Society under the Ministry of Agriculture. This Society also facilitates coordination among voluntary organisations.

The leadership of these organisations is now increasingly in the hands of persons who are not just generalist

organisers. Quite a few among them are people with distinct technical expertise and understanding. Some are engineers, some are agronomists, some are poultry experts. It is for this reason that they command the attention of the villagers.

Politically these new organisations are neutral. They seek the interest of and help from Governments and administrations regardless of their political views. They also try to use their personal influence for meeting developmental needs. But the influence is personal rather than through the party. Though these organisations seek help for meeting their non-recurring and capital expenses, they also, at the same time, seek to undertake activities that would generate funds for meeting their recurring expenses. It may be a commercial activity which might increase income from the farm. Income might accrue from customs service provided to farmers. This is undoubtedly a welcome trend as it gives them economic stability and independence. Another feature of the activities of these constructive organisations is that while they give first attention to the needs of small farmers in the implementation of the programme, they take care not to isolate the small farmer from the prosperous ones. They seek to maintain the goodwill of all sections of society in the compact area and thus achieve results for the entire population.

Since 1966 some interesting programmes undertaken by these non-Governmental institutions have been noticed. The Malwa Water Development Society, Indore which has a non-Governmental committee under the chairmanship of a retired officer, has done excellent work in developing ground water resources. Its team is technically competent and is able to pay its way. Another organisation that has concentrated on ground water exploitation is the Tubewells Development Organisation in Turkaulia, in Champaran district of Bihar, and the Bihar Relief Association which under Jaya Prakash Narayan's guidance operates on a much larger scale.

The development of fishermen's boats by a small Fishermen Centre, Mutton (Tamil Nadu) deserves mention. This organisation started at the instance of a Belgian Engineer, has been able to mount engines on catamaren

boats, giving a rich dividend to the small primitive fisherman who has increased his income considerably. The D.A.V. College trust has been organising development of the tribal people in Orissa, one of its centres being near Rourkela and another in Koraput. This Society has been concentrating on land development and minor irrigation, the nucleus of its funds, a sum of Rs. 1 lakh was donated initially by Dr. A.N. Khosla. These funds have been supplemented by substantial assistance from the FFHC. The Uruli Kanchan Cooperative Society in Maharashtra has concentrated on the organisation of animal husbandry and cattle development activities. The Vaisali Area Small Farmers' Association has undertaken the drilling of tube-wells and a programme of improving cropping pattern among small farmers in North Bihar. The Rama Krishna Mission Centre in Narendrapur in Howrah District has organised an excellent programme of poultry development. The Uttarakhand Nidhi in the Almora district of U.P. is concentrating on horticulture and mushrooms. The Mitra-niketan near Trivandrum in Kerala has a noteworthy programme of cattle development, poultry and crops. AVARD which is an Association of Volutary Organisations undertook a programme of minor irrigation based upon food for work in Hazaribagh district. The Andhra Mahila Sabha at Hyderabad has organised a Farmers' Training and Functional Literacy Programme for women in the Mahboobnagar District of Andhra Pradesh.

There are several other organisations that have been engaged in these activities which have grown during the last 5 or 6 years. The interesting thing is the large variety of constructive activities and beneficiaries for field work opened out by such programmes.

In the process of undertaking such programmes by these organisations numerous problems have come up. These problems have to be tackled with care and forethought. The first problem is that of having a cadre of qualified field workers. These field workers as stated earlier have to be different from the generalist and dedicated type of organisers. They have to be technically qualified and not merely ideologically inspired. They should be able to understand complex circulars, rules, laws

and proforma that the farmers and fishermen have to tackle for organising their programmes. These forms etc., can be a challenge even to experienced government officers. The voluntary workers should not be identified with local group interests ; yet they should be able to know the needs of those interests. They should not be worried by personal and family financial problems. Again they should have a good knowledge of the principles of communication with the villagers and of training and adult pedagogics. They should have the confidence and patience to pursue matters with Government departments, banks, commercial firms etc.

How has this cadre to be organised? One possibility could be to create a special fund in the nature of a Foundation. The interest from the Foundation funds can be used for meeting the expenses of voluntary workers. Experience of FFHC society shows that on a voluntary worker, it is necessary to spend about Rs. 500 p.m. so that he may have reasonable conditions of living far away from his home, and should not have to depend upon local charities for his peronal convenience. This cost is much less than what is spent on Peace Corps Volunteers and other foreign volunteers.

Funds from available sources could also be used for building up centres for training and orientation of these workers.

Another problem is that local organisations that are brought into existence as a result of the efforts of the voluntary workers should have regular guidance from research centres and institutions so that they could be effective with the villagers. They should also have a forum of information regarding the experience of other organisations.

A headache for organisers of voluntary institutions is to get work done for their institutions in Government offices. Every state Government should have one individual who could be a point of contact for voluntary workers so that they do not have to knock from one door to another. To him the volunteer worker could go for guidance and help in expeditious disposal of applications and proposals. Unless something of this kind is done, the departmental fragmentation characteristic of most adminis-

trations is bound to exasperate voluntary workers. Today the lack of communication among different limbs of Government causes frequent set-backs to programmes of non-government organisations.

In the long run what would sustain the voluntary organisations engaged in these activities would be their impatience for concrete results. Indignation with status quo is often an engine for change. The participational approach to the people rather than an attitude to help the villager from above would always lend strength to their effort. Externally their strength would lie in the attitude of a benign and active administration rather than one plagued with suspicion and indifference.

12

Growth of Farmers' Education in India

In analysing various aspects of farmers' training I have been well aware that in none of the training programmes in India or elsewhere can all these features be seen. Most of those concerned with agricultural development and with adult education have generally accepted training for farmers as being marginal and parallel to development and not as its core-element inter-twined with its progress. This seems to be because they have a vague notion of what farmers' training is. However, one can trace the growth, over the years, of the concept and features of farmers' training through stages of trial and error towards something more central and clear.

India is in some respects unique among the developing countries in the trends and stages of its rural development. Institutionally and in beliefs and attitudes the Indian village has had continuity over the centuries. It was in essence not affected by repeated invasions and until the British came, it remained cohesive and more or less intact. Unlike colonial powers in other parts of the world, the British in India tried to modernise Indian social life, a process that after 1835 became a mission with them. But the modernization touched agriculture only marginally and the big research centres and agricultural colleges opened by them created a class of agricultural scientists devoted to their laboratories and inaccessible to the average farmer. The British planters in Bihar and Bengal were often tyrannical and did not initiate the peasantry in progressive agriculture. Thus an anomalous situation arose ; we had a modernized and intellectually advanced urban middle class and a vast mass of traditional and backward farmers.

Another factor in the uniqueness of the Indian situation was the protracted and in many respects singular

freedom struggle under the leadership of Mahatma Gandhi. His movements and organisations were all village based. His campaigns against the British rule were so designed as to enable the village—disintegrated for the first time in centuries by the judicial, revenue and police system of the British to rediscover its entity and to be prepared to receive the benefits of reform and rural development. Yet. Gandhiji visualized rural development in a comprehensive sense and his economic programme was based upon handicrafts as a source of supplementary income rather than intensive and technologically advanced agriculture.

In the context of these two features one can trace the evolution of the concept and programmes of farmers' education through six stages of rural development. Until 1947, when independence came, the uplift of village-life was primarily conceived in terms of social reform, health measures and promotion of handicrafts. Agriculture received impetus rarely and indirectly for the sake of urban interests. Thus when sugar industry was developed cultivation of sugarcane on extensive scale led to the farmers' initiation into a new technology. This was only a marginal development. Centrally, rural uplift meant emphasis on literacy, drive against evil social customs, campaigns for cleanliness and better health, protection against diseases through innoculations etc.

It was back in 1922 or so, that Leonard Elmhirst had attempted under the guidance of Rabindranath Tagore at Sriniketan in about 84 villages a rural reconstruction programme which sought to approach the villager in various aspects of his personality. The Sriniketan experiment was however built around cooperative health organisations and handicraft workshops. Agriculture as such came later and that too hesitatingly. Much earlier, Mahatma Gandhi had, at the Phoenix Farm in South Africa, experimented with farming by the educated in the light of the philosophy of Tolstoy and Ruskin. When he came to India his rural development programme was built around the need of supplementary income to the poor farmers and labourers through handicrafts.

In the late 'twenties a British ICS Officer, F.L. Brayne, in Gurgaon district of what is now Haryana, adopted

the Socrates method of 'questions-and-answers' among villagers in order to bring about rural development. These questions and answers were brought out in the form of a book and were made available to those officers who were supposed to make them a basis for stimulating new attitudes among villagers. Here again, of course, while nonformal training appeared perhaps for the first time as a factor in rural reconstruction, agriculture as such was only one of the several aspects of rural development and not necessarily the most important.

The second stage came soon after independence. The Etawah experiment which turned out to be the precursor of the country-wide net work of community development programme in India was inspired by the image of rural life moving forward in an integrated environment so as to create an impact upon the community as a whole and its members. The detailed report of the Etawah experiment by Albert Meyers makes an interesting reading. The community development programme that followed was shaped by S.K. Dey more on the Etawah pattern than on his own earlier experiment with evolving a rural-cum-urban complex in Nilokheri. Community development project of which the net-work covered the entire country is a testimony to the comprehensive idealism of the 'fifties. But it led to one very important practical result, namely for the first time India got extension workers right down to the unit of every 100 villages. This structure later came handy when the agricultural breakthrough called for quick implementation of field programmes based on new technology. Otherwise also, the process towards the changing of the attitude of farmers, though not the skills, was generated on a country-wide scale by the Community development programme which gave to the country nearly 5,000 blocks each with extension officers on a standard pattern, and with a Village Level Worker for every 20 villages.

At this point, we come upon the third stage. At the beginning of the sixties, two trends appeared in the programming of agricultural development in India. First, the desire to move from the general to the specific, from the comprehensive to the intensive. The Community Deve-

lopment programme, involving the entire country, provided a frame-work for people's participation in all-round rural development. But soon the feeling began to grow that the 'people' consist not of an amorphous mass but of groups with specific, professional interests and needs. The specific situation and potential of a farmer growing certain crops should be identified and examined. Advice and facilities for improved production should be based on such examination. With the improvement of production and higher income, the farmer would have the incentive for a better way of life; education would spread; health standards might improve and family planning might become meaningful. This is what is meant by the 'specific' approach.

The second significant change in the approach to agricultural development programme arose from the realization that a new technology is readily acceptable to the farmer if it leads to a substantial increase in the crop-yield and consequently in his income. That is the igniting force without which much of the earlier effort seemed to fail, but failure was often attributed to the drawbacks of a tradition-based society. Consumption of inputs, demand for better storage and marketing, for farm-planning and even for information and training are all triggered off by the introduction of a technology that makes a marked and quick improvement in output.

The first sign of such technology appeared round about 1960 when hybridization of maize succeeded on the Indian soil. To farmers used to simple methods of cultivation, preparation of hybrid seeds afresh every year was a complex process. But the yields of hybrid maize at that time were substantially remunerative. The farmer found it worth his while to invest inputs, to learn the new technique and to put in more hard work. In 1964-65, technology achieved another break-through. With the cooperation of the Rockfeller Foundation, Indian agricultural scientists organized trials of the Mexican varieties of wheat—mostly dwarf, highly photo-synthetic and with remarkably high yields. Certain varieties of rice—Taiwan and Taichung—were obtained from International Rice Research Institute, Philippines and given similar trials.

Wheat succeeded wherever it was tried with adequate dosage of fertilizers and the required frequency of watering. The new rice varieties though effective in some areas were liable to pests. The multiplicity of rice regions in India called for much greater diversity of genetic qualities than for wheat which is grown over a compact zone with a uniform kind of ecology. Indian scientists got busy ; research centres and universities hummed with activity. Laboratory-work aimed at genetic improvement and adaptation of exotic seeds—both wheat and rice—using methods ranging from simple crossing to the use of nucleur energy. Trials were laid out very fast, the climatic spectrum enabling laboratories and trial fields to function all through the year in one or the other part of the country. The result in the case of wheat was phenomenal and in the case of rice promising. Farmers in areas with assured water-supply turned increasingly to the new seed. How rapidly the new wheat seed spread can be judged from the fact that in 1964 a mere 100 kilograms of exotic seeds were imported, in 1965, 350 tons and in 1966 as much as 18,000 tonnes. And, thereafter, sufficient seed was produced within the country to meet the increasing demands of farmers from year to year.

Along with seeds and chemical fertilizers, water became a crucial factor. The new seeds required from 80 lbs. to 120 lbs., per acre of nitrogenous chemical fertilizers. For enabling the soil to absorb this heavy dosage of chemicals and to carry nutrients therefrom to the plant, six to seven waterings are necessary. In the canal-irrigated areas, the farmer is usually allowed two to three waterings in the season. Where was the additional water to come from ? Ground-water was the answer. All over the plains of northern India and in the river-basins of South India, a new wave of enthusiasm for tubewells, pumps in open wells, water-filters etc., spread among farmers.

This enthusiasm was born as much out of keenness for the new seed as out of a traumatic experience to which farmers in many parts of India were subjected in 1966-67. Late in 1965 began the worst draught of the century. It lasted till the first quarter of 1967. Surface-water, rivers, tanks and even canals were no help. Those who had the

good fortune of having installed tubewells reaped excellent harvests despite the failure of two monsoons. This set the others thinking. The attitude towards groundwater changed within those two years. Tubewells multiplied fast and thousands of pumps were installed within months. During the years that followed water use and water-management that are a relatively new and complex skill began to interest farmers.*

It is in this background of the trend towards the specific as against the general, and of the transformation of the attitute towards new technology and innovation that, in the sixties, a number of programmes seeking to meet the newly-felt needs of farmers emerged. In a few of these the education of farmers was a built-in element; for some others parallel programmes of training were introduced. In either case the object in the beginning was increased production. Later, emphasis was also laid on identifying handicapped areas (such as backward hilly region) and groups (such as small farmers and agricultural labour). In the first phase, the validity of the new technology had to be demonstrated effectively so that in areas most suitable it could be quickly adopted leading to a quick rise in production. In these areas farmers themselves came forward to seek knowledge and an educational programme had a responsive field. In the second phase the role of farmers' education has had to be equally if not more crucial, but for a different reason. For the difficult areas technology had to be adjusted; to the handicapped people, small farmers and tillers without their own land, it had to be carried through organisational measures and devices that are complex. Training and education would facilitate understanding of the processes both by beneficiaries and organizers. Let us consider some of these production-cum-training programmes introduced during the sixties.

In 1960 the first attempt was made to organise farmers' training through the project known as the Intensive Agriculture Development Programme. This coincided

* How important scientific water-management is, would appear from the fact that in India hardly 20% of the water meant for irrigation actually reaches the crops while in Japan and other progressive countries the percentage is as high as 70 or 80.

with the introduction of hybrid maize in the country. The programme set out to develop modern productive farms and farmers and a modern agricultural system on a pilot basis. Its aim was to "begin with farms, farmers, and the resources and opportunities available to them".* It selected districts (only 17 out of 329 in the country) with a favourable economic climate. The staff at the district block and village levels was increased and their emoluments were higher than in other community blocks. The organizers concentrated on one-third land of participating farmers by drawing up detailed plans and guidances and giving them special facilities for inputs, and finally by making a special arrangement for credit through cooperatives etc.

Later on some other elements were also added such as marketing and storage.

In order to expand the programme a more diluted version was introduced in some other districts, called Intensive Agricultural Area Programme (I.A.A.P.) with the difference that the concentration was on one particular crop in a particular area depending upon its requirements and conditions.

Another phase in the I.A.D.P. came in the wake of the agricultural breakthrough after 1965, with the introduction of new high yielding varieties of seeds. It was felt that the number of I.A.D.P. districts should be reduced since the breakthrough had involved a large number of districts in intensive agriculture almost automatically. The reduced number of I.A.D.P. districts have been sought to be made into a sort of a laboratory for more individual-based operations on the farms. In a report originally prepared in 1969 and revised in August 1971† an account has been given of four districts, West Godavari district in Andhra Pradesh, Rajpur in Madhya Pradesh, Karnal in Haryana. The report on West Godavari refers to the usual constraints on higher production, such as slow development of irrigation, lack of high-

*A guide to Agricultural Modernisation by Malone, Shastri and Francis, Ford Foundation, New Delhi.

†Robert W. Wilcox, Consultant on Agriculture Development, Ford Foundation.

yielding varieties suitable to the area, lack of fertility evaluation work and the flooding of a lake area. A point of relevance to training is that the Agricultural University at Hyderabad had posted five staff members in the district in 1969 to assist the staff carry on adaptive research. They cooperate fully with the regular extension staff and are responsible to the Project Officer. This was an example of the beginnings of research-cum-training centre in an area where if other restraints can be overcome training can play a crucial role.

In Karnal district, the intensive operations were based upon a district development plan prepared by the Deputy Commissioner. It effectively identified the major problems. The Deputy Commissioner was also able to mobilise non-plan resources. But the experiment also showed that there is an immense unutilised potential for the training of farmers at the Karnal Dairy Institute. Its resources and campus could provide facilities for short duration training to progressive farmers in new techniques. In fact for quite sometime the Dairy Institute remained something of an island and it is only recently that it is getting involved in its neighbourhood. This shows that the original concept in I.A.D.P. of having a self-contained set of extension workers is proving inadequate. As has been stated in another chapter in this book, and as has also been indirectly suggested in the interim report of the National Commission on Agriculture, all development programmes call for training and research linkages with either the nearest agricultural research centre or agricultural university or a specially set-up adaptive research centre. The Karnal experience also shows that I A.D.P., is more likely to succeed if the District Officer (Collector or Deputy Commissioner) gives to agriculture high priority and close attention in the set-up of the development of the district.

In Raipur district of Madhya Pradesh, right from the beginning, the programme has generally been need-based. It has a population of 1.6 million with 3,800 villages. The significance of the Raipur project as reoriented in recent years, lies in what has been called the "total village development effort." The district was divided into three zones in 1968-69 and later each zone was sub-divided into

two smaller zones each with a small committee of its own. For each sub-zone, special programmes for those areas were drawn up. Thus, for zone I-A, staff was mustered from some other zones and concentrated on 200,000 acres of irrigated rice so that there was one field worker for each 1,500 acres of rice. There were, of course, production committees at local, zonal and district levels. The importance of the Raipur experiment lies in combining training with detailed and close attention to farmer orientation at a heavy cost which the State Government in this case agreed to meet.

Does the future of the I.A.D.P. therefore lie in this kind of 'laboratory' work on a highly intensive farmer-oriented system ? The National Commission on Agriculture in its report* has rightly observed that "the training of millions of farmers is a gigantic task. Even to train the trainers is a sufficiently big task. A few farmers' training centres or schools established in each State cannot be adequate for the purpose. Nor is it sufficient even if the agricultural universities attempt to train a large number of farmers on the campus. All facilities and methods of communication will have to be utilised if the objective of training at least one member each of the farming families is to be achieved." Undoubtedly, the Raipur experiment and the other I.A.D.P., experiments seek in an intensive and exhaustive manner to reach individual farm families. It would, however, be a pity if the I.A.D.P., districts were to remain non-repeatable and expensive undertaking from which only bits of lessons could be applied elsewhere. The future of the I.A.D.P. would seem to lie in their becoming "model areas' of non-formal education for farmers." Five districts which are continuing as I.A.D.P. districts should be not educational centres but educational areas for other parts of the State in which each of them is situated.

Hitherto, we have thought of farmers' training, and the training of trainers, in terms of institutional and non-institutional training but at selected centres. Would it not be practicable to give a new dimension to this concept

*Interim report on Some Aspects of Agricultural Research, Extension and Training, National Commission on Agriculture, November 1971 (p. 59).

and to treat an entire district or area as a training district both for selected farmers from other parts of the State and for extension workers and scientists ? In that event the heavy expenditure on these districts could be justified. Small teams of farmers and extension personnel from outside could be attached to specific sub-zones for short-periods. The teams should be prepared to share the work of the local farmers and field workers. Work could be followed by discussions and question-answer sessions. Perhaps there might be no better field-training than work and talking in the midst of an intensively developing farming situation.*

The repeatability of such facilities as one field worker for every 1,500 acres may be expensive. However a situation may soon arise when farmers, formed into groups may be able to meet the expenses on field workers for the services rendered by them. This can be practicable mainly in areas where multiple cropping would be introduced or where subsidiary sources of income to crops can be organised.

It was within four years of the introduction of the original IADP that India had the breakthrough in wheat which has crystallised itself into what can justly be called a Wheat Revolution. Hybrid Maize was already spreading and high yielding varieties of rice and sorghum (Jowar-Bajra) were also introduced. This ushered in the *fourth* stage of the evolution of the training concept. The training programme followed the motivation widely generated among farmers in districts and areas that were found suitable for the High Yielding Varieties programme. The latter is a production programme

*Incidentally, this may well herald a modified form of UNESCO's Scheme of field seminars which they have organised in some countries in the Middle East and possibly in Latin America. In these seminars selected agricultural administrators, functional literacy experts and other supervisory personnel, are taken to certain field areas in order to observe in person the working of the functional literacy and farmers' training programmes, at first hand. It was not found practicable in India initially to have such a project because the internal needs for this kind of training are more pressing and also because the observations and studies would be more fruitful with one complete team from one particular area returning to their own area and experimenting with the result of what they observe on the field. Moreover, field seminars are likely to be more effective if they observe not merely functional literacy but the entire process of agricultural development.

introduced initially in 1965-66 in a few districts only. Within a couple of years it spread to most areas with assured water-supply for the particular crop or crops of which the high-yielding seeds were to be introduced. As as upport to this nearly country-wide intensive production programme a project of Farmers' Training and Education was drawn up in 1966-67, designed to cover 100 districts.

The Farmers' Training and Functional Literacy Project, in conjunction with other complementary inputs, aims at increasing yields per acre and also the number of crops per year involving a large number of farmers—big and small—in the High Yielding Varieties Programme through imparting them knowledge and skills necessary for the use of production requisites like seeds, fertilisers, pesticides, implements, irrigation, etc. This is to be done in an intensive manner enabling the farmers to keep pace with the changing technology

National Demonstrations and secondary demonstrations organised on farmers' fields supported by audio-visual aids, on-the-spot peripatetic training, training on specialised topics of farmers' interest, farm broadcasts, farmers discussion groups, and functional literacy, form the main components of the training effort.

The programme has been designed to cater to the requirements of the farm family as a whole and endeavours to take the training to the farmers' door-step rather than bring the farmers to a formal institutional environment. The various components of the training provide the versatility to suit requirements of farmers in varying situations.

The programme was initiated as a Centrally sponsored scheme in five districts in 1966-67 ; 20 additional districts were taken up in the year 1967-68 ; 25 in 1968-69 ; 10 in 1969-70; 20 in 1970-71 ; and an equal number in 1971-72 bringing the total coverage to 100 districts in the third year of the Fourth Plan period. Initially, it took some time to establish all the elements of the programme on the basis of the stipulated complementarity, and now in nearly 80 districts the effort can be considered as having been satisfactorily launched. Until March 1972, nearly

850 thousand farmers had attended training sessions organized by the special staff (peripatetic teams) under the Project.

At the formulation stage of the farmers' training programme, representatives of the State Governments were invited and the broad outlines of the project discussed ; later, four Regional Consultative meetings were organised in which the State Governments and the key field functionaries of the region participated. In addition, State-level orientation meetings have been held from time to time to provide opportunity to the functionaries involved in the programme clearly to understand the objectives and methodology so as to facilitate smooth implementation.

In order to bring coordination in planning and implementation of the programme, Coordination Committees have been set up at the National, State and District levels. In certain Farmers' Training Districts, such committees have also been set up at the block level. The Inter-Ministerial Coordination Committee at the National level generally meets once in a quarter and deals with important policy matters and decides broad approaches in programme execution. The Coordination Committee set up at the State and District level provides over-all guidance in implementation of the programme at the field level.

Being a new effort involving several agencies, it has been necessary to orient the functionaries at the various levels. Initially, orientation training of the trainers was organised by the Government of India in the Farmers' Training District, Agra. Later, the effort was spread out. The training of the field functionaries is now being continued at the three Extension Education Institutes in the country ; so far, eight training courses have been organised covering 121 staff members.

Special training in the handling of audio-visual equipment is organised regularly for the State level Information Officers ; workshops at regional levels are also held particularly for the members of the peripatetic teams. Five such courses have so far been organised in which 88 officers participated. A week's training for the Radio

Contact Officers has also been organised by the Farm and Home Unit of the All India Radio. In addition, field visit by the staff of the Farmers' Training Centres to some of the successful farmers' training districts has enabled fuller acquaintance with the various training methods and techniques adopted successfully in the implementation of the programme.

The focal points of farmers' education are demonstrations organised on farmers' fields. In each district there are about 15 National (Centrally sponsored) demonstrations conducted by Specialists from Universities and Research Centres, covering all important crops in rotation. But, since these demonstrations may not be able to meet the total needs of a district, other scientific demonstrations conducted by the State Governments, input suppliers and voluntary organisations are also venues for farmers' training and education in the district. Farmers within a walking cycling distance attend "Field Days" at the demonstrations farms at the time of important crop operations. The date, time and venue of Field-Day-operations to be carried out, and the specialists available for consultation on field problems, are announced in advance through the radio. A number of State Governments are also conducting some demonstrations in respect of specific crops and operations. A new programme for providing demonstrations for the promotion of fertilizers and balanced use of fertilizers has been recently taken up.

Under the National Demonstration Programme, multiple cropping is being demonstrated very intensively. The minimum yield targets are 9 and 11 tons/ha for two and three crops per year respectively. Four Subjects matter specialists per district in the disciplines of Agronomy, Soil Science, Plant Protection and Agricultural Engineering have been provided and are in position in 75 districts.

Upto March, 1972 the total number of national demonstrations was 6,405 throughout the country. In the year 1970-71 the targeted yields of 4 tonnes per hectare was achieved in 84% of the demonstrations having paddy, 81% having wheat, 75% having maize, 55% having bajra

and 50 % having jowar crop. On the whole, 70% of the demonstrations having two and three crops have achieved the targeted yield of 9 and 11 tonnes/ha respectively.

In order to link up organised demonstrations and supporting follow-up efforts, there is a provision in each district for a peripatetic team of trained and experienced field personnel having at its disposal a specially designed and fully equipped audio-visual-cum-exhibition van for holding "Field Days" and training camps on high yielding varieties crops. Farmers from local and neighbouring villages are invited to participate in these training camps. The peripatetic teams arrange for the dissemination of information on high-yielding varieties programme through films, film strips, crop specimens, samples of inputs and other audio-visual media. It provides required extention support to the national demonstrations and other field demonstrations in the district. In the training camps organised for farm women, particular stress is laid on matters like consumer education on high-yielding varieties cereals, seed selection, domestic storager of foodgrains, etc.

Rapid advances in modern agricultural technology have highlighted the need for training in some specialised areas also. Also conveners of Farmers' Groups need to be trained in group dynamics etc. These needs are met through specific subject-matter training courses conducted at agricultural colleges, research stations, farmers training centres, etc., where expertise and physical facilities are available. These courses are generally of short duration. So far 4,000 short courses have been given

Farmers' Discussion Groups are organised in the villages to serve as a continuing medium for imparting the latest farm and home development information to their members and encourage the adoption of improved practices through group discussions and radio listening. These groups are closely linked with the demonstrations, and to facilitate the listening by them of bi-weekly broadcasts, the groups are provided with low-cost transistorised radio sets at subsidised rates. Listening groups try to establish a two-way communication channel between farmers on the one hand, and specialists and the All India

Radio on the other. The total number of Farmers' Discussion Groups including the Farmers' Forums is 16,440 and the number of membership so far reported is 50,690. Obviously some forums have faded out.

All India Radio provides information support to the farmers' training and education programme. In each training district, there is a Radio Contact Officer who is responsible for collecting information about the High-Yielding Varieties Programme from relevant sources. The programme of national demonstrations and other agricultural activities in the district are supported by bi-weekly radio broadcasts on fixed days during a week by the Farm and Home Unit of the All India Radio. In addition, special information of urgent nature such as outbreak of pests and diseases in epidemic form are also broadcast as necessary.

Twenty-seven Farms and Home Broadcasting Units established in consultation with the Ministeries of Food and Agriculture and Education are regularly putting out Farm and Home programmes bearing on Farmers' Training and Functional Literacy efforts. Each station puts out an half-an-hour hard-core programme in the evening. Twelve of them broadcast special morning programmes of short durationand eight stations broadcast afternoon programmes of 5 to 10 minutes mostly dealing with topical hints and infor mation designed to assist farmers increase production. These broadcasts also include the home component designed to assist farm women improve their living standards.

The programmes convey instructional material through talks and interviews, discussions and documentaries in addition to providing vital information such as weather reports, market reviews, etc. An attempt is made to link radio broadcasts to the problems arising in the field from time to time.

During the period January to December, 1971, All India Radio broadcast a total of 3,044 programmes on Farmers' Training, 699 on Functional Literacy, 3,135 on home problems and 557 on National Demonstrations. The number of letters received from individual farmers

during the same period of January to December, 1971, was 57,691. Farmers' Discussion Groups sent 10,572 letters to the radio stations. In all, answers were provided to 1,42,852 questions raised by farmers.

To improve the quality of broadcasts, workshops were organised jointly for the Farm and Home staff of All India Radio and personnel from the Farmers' Training and Functional Literacy and National Demonstrations Projects. So far five such Workshops have been organised at the state level.

Eleven more Farm and Home Units of All India Radio have been sanctioned for 1971-72 which will soon go on the air and eight more are proposed to be set up during 1972-73, bringing the total number of Farm and Home units to 46 by the end of the 4th Plan. When these are set up, they will be able to provide the necessary radio support to all the 100 districts taken up for the F.T.F L. Project.

In the context of the fast moving developments in agriculture where extensive areas are being brought under high-yielding varieties and multiple cropping programme, farmers were keen to see progressive farms and exchange views with fellow farmers on current programmes and field problems. Opportunities to visit other progressive farms and agricultural institutions such as agricultural universities, research stations etc., are also occasionally provided under the project.

Functional literacy as an integral part of the programme is organised among illiterate groups of farmers to make them functionally more meaningful in the context of modernising agriculture. The literacy primers especially designed for the effort contain basic information in regional languages on agricultural inputs required in the High-yielding Varieties Programme, preparation of farm plans, maintenance of farm accounts, posting of inputs cards and writing simple applications for the supply of credit, etc. Literacy effort is, thus, directly linked to the requirements of the farmers and serves a tool for improved farming.

Started in 1967-68 in 3 districts, the Programme has

progressively moved upto 80 districts in 1971-72. About 70,000 farmers have been made literate and about 100,000 are currently participating in the programme. When the 20 new districts of 1971-72 start running the functional literacy classes—after they have completed the base-line surveys, etc.,—the current enrolment is expected to move upto 136,000. The annual outturn of beneficiaries is expected to go upto 1,50,000 and 1,80,000 from the middle of 1972-73 and 1973-74 respectively. [The Fourth Five Year Plan's (1969-74) target is to cover 100 districts with one million adult farmers].

About 3,500 instructors of Functional Literacy classes have so far received training through the arrangements made by their respective district administrations, with occasional assistance from the Central Directorate of Adult Education in the form of peripatetic teams of trainers deputed to the Training Centres on request. The Central Directorate of Adult Education, by itself, has organised 9 orientation and training courses for supervisors and district-level project officers and has trained about 200 officers in these two categories. However, the training programmes have since been decentralised. Under the new arrangements, training cells, with 3 to 4 key-level personnel, have been set up in each State for meeting their respective needs of training in this field, while the Central Directorate of Adult Education, in collaboration with regional colleges of Education, organises the training courses for only the key-level trainees from each State.

In order to strengthen the information and communication support to meet the requirements of farmers' training programme, various audio-visual equipments have been received under the Project. These equipments are meant to provide information support from the National, State and the District levels. In addition to the equipment provided by the UNDP, a range of audio-visual aids procured locally are also provided particularly at the District level. The State Information Units have been given slides and film strips-making equipment. Some State Units have already taken up slide production. Short instructional films are being produced at the Centre and distributed to the training centres for use in the training

programme. Several districts are bringing out folders and leaflets for use by the discussion groups of farmers. Fortnightly or monthly Newsletters are also being brought out. The audio-visual-cum-exhibition vans carry films, film strips, samples of inputs, posters, preserved specimen and specimen of pest-affected crops, etc., and make rounds of the national demonstration net-work in the area and also call at the meetings of the discussion groups.

Production-centred training of farmers and other primary producers implies a project approach rather than territorial approach to the structure and programme of training. How is the present extension network as well as training personnel to be adjusted to the specific project system ? One answer seems to be that the funds and resources for the training of farmers and primary producers should constitute an essential element in any scheme for crop development that is drawn up and implemented. For example, if in a particular district there are schemes for sugarcane, cotton, pulses, soyabeans, vegetables, oil-seeds, and tobacco cultivation to mention only a few, in the financial provision for each of these schemes, a certain sum should be provided for farmers' training. While this provision should be specifically for that scheme, the responsibility for the coordination and implementation should be that of the Training staff appointed for the High Yielding Varieties Programme which will, however, have to be supported by the specialist staff required for specific scheme. This suggestion could also apply to some major development schemes that have subsequently been introduced such as dry farming, and small farmers development. The suggestion implies also that the assumption that the training programme for any new scheme can be tackled only by the existing staff in the district will have to be revised. If additional fertilizers, additional loans, additional pesticides, etc., are provided for new schemes, it seems reasonable to expect that the human input, namely, training would also have to be raised proportionately.

The project of Farmers' Training and Functional Literacy for participants in the High Yielding Varieties areas is marginally assisted by U.N.D.P., with F.A.O. and UNESCO functioning as executive agencies. Globally, it

is treated as one of the eleven Functional Literacy projects that Unesco had initiated for U.N.D.P., assistance. The Indian Project differs from the other in two respects. It is a national-scale project covering one-third of the total number of districts in this large country, while the others are small-area projects of pilot and demonstration type. Moreover, in the Indian project farmers' training and functional literacy is meant to serve and strengthen a much bigger development programme on high yielding varieties, the projects in other countries have been designed so as to cover both the development and functional literacy and training elements. Consequently, Unesco has tended to signify by "functional literacy" a developmental programme in which literacy is one element. In India since the developmental programme was already in operation, both farmers' training and functional literacy have a distinct entity and in the search for their integral relationship with the crops development programme new techniques and principles are being evolved.

While the High-yielding Varieties Programme was transforming Indian agriculture, certain other developments took place that gave new directions to the quest for appropriate form and techniques of farmers' education.

The drought of 1966-67 led to a country-wide realization of the importance of ground water. If the new seeds were to succeed, dependence on the monsoon would have to be reduced. Tubewells were the answer. In the Indo-Gangetic basin as well as in the river-basins of Central and South India, wherever ground water was available, drilling of tubewells was undertaken and the demand for loans increased. Several charitable organizations that were engaged in distributing relief to the people, turned to the task of providing long-term protection to farmers against droughts. Helping farmers to have tubewells appeared to be that kind of long-term remedy. Consequently, both at Government and non-Government levels, intensive drilling operations were undertaken and several voluntary organizations assisted by donations from abroad came into existence. It was soon found that providing tubewells would not suffice unless farmers were given training in proper use and management of water and in the

maintenance of pumps. This then was the *fifth* stage of the growth of farmers' education.

Two kinds of training programmes were organized. The Malwa Water Development Society at Indore was one of the four voluntary organisations to undertake a programme of tubewell drilling. For building up its technical staff the Dutch Adviser decided to take local village mechanics and farmers sons and trained them, not in classes, but on the spot where drilling was being done. The Turkaulia Block Project Implementation Committee in Champaran District of Bihar formed with technical assistance from Norway likewise set up a technical team consisting of young people from local farming families. This team of drillers of tubewells is now so expert that in the whole of north Bihar there is a demand for it in preference to commercial units.

The other kind of training namely in water uses and water management is more basically the concern of farmers in newly irrigated areas. Though extensive canal irrigation is a century-old facility in parts of India, systematic and scientific uses of water was never practised by farmers. Irrigation was treated primarily as a protection against the contingency of a drought. The need for maximized use of water from irrigation sources arose with the demands of intensive and multiple cropping in the wake of high-yielding seeds that gave short-duration crops. Private or group-owned tubewells also made farmers conscious of economical use of water. The Water Development Society, Indore to which reference has been made earlier realised soon after it began its programme, how important such training was. It drilled a number of wells in hard rock and alluvials of Madhya Pradesh mainly for irrigation purposes. It worked strictly on commercial basis in the sense that subsidies were avoided and farmers has to deposit funds. A case study of the village Dakacha in this area shows that as a result of the availability of water it is possible for farmers to reap two or three crops a year independent of the annual rain-fall. Further, the yield of each crop has increased three to nine times. But the study also shows that in some cases the seed input was poor and in most cases there was lack of systems in the

number of waterings and the quantity and distribution over all period of time. One could only infer from the high electricity consumption about the use and quantity of water. The number of waterings and the dosages devised by the department could not be indicated to the farmers because this scheme did not contain in it the element of training for farmers at that stage. In fact, two years after the programme was launched the Dutch engineer incharge realized that there has to be systematic training of the farmers in land levelling, drainage and the entire gamut of the agricultural operations if the programme of drilling water was to be made a success.

Water management is a relatively new skill even in the West. Therefore, Government of India began with a U.N.D.P. pilot project in three places – Azamgarh in U P., Tungbhadra Command Area in Mysore and Hisar in Haryana. Land levelling with proper slopes, channel-making so as to reduce surface, re-arrangement of plots so as to avoid waste of land in channels, techniques of reducing water-evaporation, relation between number and quantity of watering to crop-needs and fertilizer dosage, adequate and economical facilities for drainage – these and several other practices had to be taught to farmers in newly irrigated areas by laying out demonstration on their plots. Planning, development and training have to proceed together and the programme is by no means simple, since often it implies consolidation. Indeed consolidation which as a programme by itself generally meets with resistance is welcomed and even asked for by farmers participating in a water-managemant project. The success of the three pilot projects has led to the introduction of similar programmes in several other areas. Training in water-management may well become an essential element of all irrigation projects minor or major in the future. Also its scope might be expanded to include cropping practices, storage and marketing. The motivation for obtaining maximum returns from the investment in irrigation is strong enough for that. Such composite training will be part of what is known as Ayacut (or Command area) development programme. In the command areas of Kosi, Nagarjuna Sagar,

Pochampad, Tungbhadra and Gandak and a few others, area development programmes have been introduced substantially financed by the Central Government, who meet the cost of marketing, construction roads and storage.

Finally, the *sixth* phase of the growth of farmers' training in India came as a result of two pressures. One pressure arose from the emphasis by the ruling party on implementing the ideal of social justice. Small farmers must benefit from new technology of agriculture. For this purpose apart from the redistribution of land and completion of land-reforms small farmers need to be given the inputs and the skill to use the inputs effectively. Training has, therefore, to be an integral part of the special measures proposed to be taken for small farmers in selected areas. The other pressure which was in parts connected with the first, was for the application of extension, communication and training methods to subsidiary agriculture that is, animal husbandry, poultry-raising, sheep-breeding, fishery, farm-forestry, vegetable and fruit crops, etc. etc. These are all sources of additional income to small and marginal farmers whose crop land is too small to make them self supporting.

One result of these two pressures was the preference for area-development, that is, multi-disciplinary development of a given area with the population having certain common problems. The spectrum of activities may, eventually, be large, embracing such items as land-improvement, distribution of water, drainage, various aspects of field-cropping, poultry, animal husbandry, orchards etc. Which of the numerous items would be planned and organized earlier than the others would depend upon the problems of the area. Identification of problems would be the first task and then the chain of programme-items would follow the chain of the local problems.

Thus in the Mandi district of Himachal Pradesh (in the Himalayas), a project with German assistance was launched first with scientific drainage of a valuable low-lying land that was affected by salinity and water-logging. That was the most obvious problem. The expert team

used locally available material (roof-tiles) for making a net-work of underground channels on the land to be reclaimed. The land thus reclaimed was used for high-yielding and multiple cropping. Traditional tools in use in the areas were found to be inadequate for the effic ent and quick preparation of land and other operations for multiple cropping. This led to the setting up of a work-shop for fabricating improved tools and their repairs. Improvement of the land in the valley generated a demand for doing something for the people in the uplands. It was found that many of them kept cows and sold milk but the market in the upper areas was limited and unremunerative. The Project set up milk-collection centres in the uplands and arranged for ready payments on the spot. With the incentive for producing more milk came the demand for better breeds of cattle. Frieson cattle were imported to produce a highly promising cross-breed. The possession of a cross-bred cattle carried with it the reponsibility of following a schedule of feeding and service etc. Systematic maintenance and stall-feeding of cross-bred cattle meant that more droppings were available for making organic manure. Also silos for cattle-feed were made. Pasture on the slopes were improved. And thus the cycle went on and programme followed programme.

In such a situation of quick sequence of new and remunerative programmes, training of farmers is a necessity at every stage. Organised training with all the elements visualised in earlier chapters of this book was not intro-duced in a planned way in the beginning. But practically every new activity involved demonstration and oral explanations and discussions with farmers. As the pro-gramme-items multiplied, the training outlines got more sharply defined.

Another example of an area-development programme is in the Dandakaranya region of Madhya Pradesh State. It is a big forest region largely inhabited by the tribal people, where a multi-purpose development project has been in progress. In some small and compact portions of it, the forest has been cleared and on the reclaimed land, refugees from East Bengal (who came long before the 1971 War) have been settled, each having been allotted

homestead land and farming land. One of these compact areas near a place called Pakhanjore has been selected for an Indo-Japanese project of agricultural development. There the immediate problem was that though a medium size surface irrigation work had been provided, the water was insufficiently used, the yield and income were poor and the agricultural tools were inadequate to the task.

Detailed planning, holdingwise and areawise of all aspects of development has been done and the training of the farmers on their own fields by the skilled experts from Japan helped by Indian counterparts has been arranged. The area was divided into two zones for agricultural development. In the first instance a technical team conducted an intensive survey and prepared a detailed blueprint of each of these zones. It called for special arrangements for irrigation, consolidation of holdings and the employment of different techniques for upland farming and for farming for which water is available.

The design of the Dandakaranya Agricultural project is based upon two basic sociological conditions. The first is that here the project organisers are dealing with newly settled villagers who had come as refugees from East Bengal. These people were in a mood to accept life almost as a new adventure. In other words, from the training point of view they were already in a receptive mood. The second point was that these newly settled villagers were surrounded by the tribal people of Madhya Pradesh who were understandably suspicious in the beginning and for whom programmes had to be drawn up not only suiting their traditional ways but also so as to promote harmony between them and the new settlers. The project as well as the training cover both these groups. The approach to the two groups varies considerably. In the case of the refugees their plots are generally treated as demonstration plots and they are associated with development at every stage. The tribal farmers are called to the centre of the Project (where there is a developed farm) for 3 or 4 days at a time, at various stages of the crop operations. They go back and apply on their farms the techniques that they have learnt. In this way they are able to test

what they have been taught and do not have to leave their farms for long periods.

An example of area development being organised around an agricultural activity other than field crops is the project for small fishermen near the southern-most cape of India, Kanyakumari, around a village known as Muttom. These fishermen use rather primitive boats called catamarans, made of three logs of wood tied to each other. This boat is skillfully navigated by fishermen, who have been doing so perhaps for centuries. In this project these small fishermen, who are very poor and illiterate, are taught how to fit out boat engines to their age-old catamarans. The project is run by the Kottar Social Service Society, assisted by the Freedom from Hunger Campaign of India. There are about 20,000 catamarans in use. The project, which has also been assisted by a charitable organisation in Belgium, obtained from there 100 marine engines. Each fisherman going out into the sea for fishing takes the engine from the workshop, fits it on to his catamaran and returns it to the workshop after completing the fishing trip, for service, removal of salinity, oiling and greasing. Lobsters and various kinds of quality fish are available in plenty on the Kanyakumari coast. As a result of fishermen's mechanising the catamarans in this simple way, they are able to get much larger catches, they can travel against the wind and current, they are not dependent on wind and their travelling time is also reduced. As they don't have to row, they are able to fish more than in the non-mechanised catamarans. For servicing the engines, they have two workshops in two villages and the servicing is done within the sight of fishermen who are thus able to know a good deal about the working of the engines. Moreover, the project has been giving training to young fishermen specifically on over-hauling and cleaning the engines. Already 100 fishermen have been trained. Apart from this intensive training, the general body of fishermen have been called once a week on Sundays to a meeting at which instructions are given on navigation and fishing methods.

The fishermen have also been provided with improved gear. Nylon thread is sold to them at no loss no profit

basis. The women of fishermen are engaged in making nylon nets out of these threads. This gives them extra income apart from the training in using the new material.

As in the Mandi project here also one thing has led to another. Thus, now that the fishermen have got used to mechanised catamarans, they have been introduced to India-made French-Dori type of modern boats fitted with diesel engines. The initial experiment was successful and these illiterate fishermen took keenly to the new unit. It has grown popular with fishermen as catches are larger. Out of the four such boats obtained, three have been given on hire to three fishermen on hire purchase basis. The fourth one is being used for experimental purposes. The next stage arose because fishermen clamoured for being given an opportunity to go out farther into the deep sea so as to exploit a rich fishing ground about 35 miles south of Muttom, called the Wadge Bank. Since the intention is not to give up the catamarans altogether, an interesting device has been resorted to. With the help of trawlers catamarans will be towed to the Wadge Bank fishing ground. They will, therefore, be able to use their own catamarans mounted with engines and exploit rich shoals.

Though a literacy project for the adults has yet to be undertaken, fishermen themselves have been keen to do something for their young ones. Consequently the project will be starting a High School, which will provide diversified courses. In that High School from the 9th standard to 11th standard, the pupils will be taught, in addition to their curriculum studies, navigation and seamanship, practical and theoretical fishing technology, fishing with boats and nets, practical engineering classes, net making etc., etc.

Altogether there is a general awakening among the fishermen of coastal villages. Marketing problem is to be handled by providing special vehicles. Once the Wadge Bank is exploited, it may be necessary to have refrigerated cars. Thus a small unknown village has embarked upon a remarkable adventure in which the entire community is undergoing, consciously or unconsciously a variegated learning process.

A more massive example of subsidiary food production being stepped up leading to training is to be seen in a part of Western India. Milk area development has taken place during the last 25 years in Kaira District of Gujarat. This is the work of the Kaira District Cooperative Milk Producers' Union Limited, Anand better known as Amul. Organised primarily to provide proper marketing facilities for the milk producers in the district, the Union began pasteurising milk in June 1948 for the Bombay Milk Scheme—just a handful of members in two village cooperative societies producing 250 litres of milk a day. An assured market gave a great incentive to these milk producers. By the end of 1948 membership increased to 438 and the milk handled to 5,000 litres a day. By 1953, the quantity of milk increased so much that at that time the Bombay Milk Scheme with its limited plant was not able to absorb the extra milk collected by the Union in winter. To prevent sales at low rates to middlemen, the Union decided to set up a plant to process the extra milk for milk products, such as butter and milk powder. Assistance came from FAO and UNICEF and a big factory was established and further expanded in 1958. What is more, cheese began to be manufactured from buffalo milk, for the first time in the world. Baby food also began to be processed as also sprayed milk. How phenomenal has been the expansion, since then, would appear from the fact that in 1970-71, the number of societies was 706, the number of members 1,80,000, the quantity of milk collected was 1,18,225,273 kgs., in the whole year, and the total turn-over was over Rs. 270 millions.

What the cooperative means to the farmers of Kaira district is demonstrated every morning and evening at any Union village when ordinarily queues of 100 to 200 people come for delivering their milk at the Milk collection centre. Trained staff receives milk, tests the sample for quality and fat contents, making entries in the Society's records and in the pass-book and makes payment on the basis of a scale test on the quality determined by measurement of its fat contents. Milk received at the Society in the morning is paid for the same evening. I

had an occasion to see the goings-on at one of the milk collection centres and was impressed to see the education which the men, women and children were automatically receiving in the technique of chemical testing of milk, in the use of ready-recknor, in the maintenance of accounts through their pass-books.

However, there are other ways also in which the Union gives training to its members. The Union has an excellent artificial breeding centre at Anand and has sub-centres in a large number of villages. The semen is transported to the sub-centres by the Milk trucks. The Union also gives assistance to the local societies in the breeding programme. At the artificial breeding sub-centres there is a good opportunity to the farmers to learn about the entire process of artificial breeding. The Union has extended this facility by periodically inviting farmers and their wives to the main centre. There they are taken to the laboratories, watch the extraction, testing and preservation of semen, see charts of the physiology of animals. Men and women are taken to the laboratories separately. Thus an excellent opportunity is available for speaking to the two groups on family-planning.

Another item of training to the milk producing farmers is feed improvement. The Union has its own mixing plant. Feed mixtures in pellet form are sold at a shop located close to the milk collection centre. This gives an occasion for providing instructions about the feeding programme of their cattles.

The Union runs its own practical demonstrations on cattle maintenance and provides short courses to villagers. A popular forum for instruction and clearance of doubts is the periodical village meeting near the collection centre at which films are shown, demonstrations given, and questions answered. There are societies, which out of their profits have provided libraries, schools, common water supplies, health centres etc., to their villages. In some villages even local industries have been promoted. Thus starting from milk collection the whole organisation has become a nexus of multi-purpose development of the district. In this process an all round education of the farmers and their families has been achieved and foundations laid for a

proper education of the young generation so that they may contribute to the economy of the Community through modern methods rather than quit the village for city life.

Another kind of area development that is beginning to take shape and in which training in new skills is crucial is that in areas of dry farming. In these areas rainfall being meagre and ground water not being readily available, new kinds of techniques have to be adopted for the optimum use of the limited water and for the conservation of the moisture etc. These areas abound in small farms. Government of India has taken up a nationwide programme for research in dry farms technique and also development to which reference has been made in the chapter on the role of research. But recently a small project was taken up in 30 villages in the neighbourhood of Pondicherry. The non-government organisation that has taken it up is the Sri Aurobindo Ashram Society, which has a big project to built a new Settlement, called Auroville. The Society has had for sometime three farms of its own in that area. For this project these are treated as nucleus farms. Around each farm 10 villages within a radius of 1 to 3 miles were selected. For these villages improved machinery and tools were obtained, and a programme of development and training was worked out. The machinery was used not only at the nucleus farms but also for demonstrations and for hiring to farmers. As a preliminary to the programme a survey was also done. The education and training programme, which had been in progress for a year at the time of reporting was carefully planned from the beginning. First, there was a leadership training programme, under which 30 farmers were selected from each group of 10 villages. They attended an intensive course at the farm. Most of them were literate. Half the day was given to practical work and half to discussions and talks by experts and specialists. At the inauguration of these courses, special demonstrations were arranged in the presence of the audience which included other farmers.

The second element in the training programme was field demonstrations.. 34 demonstration plots were laid out in the farmers' own fields and there were 105 field

days at which local farmers were also invited. Altogether over 5,000 farmers participated in these field days.

Thirdly, out of 181 leaders, who had received training at the farms, 30 trainees were choosen to be conveners of discussion groups. These 30 groups consisting of farmers, have been gathering frequently to listen to the radio programmes and to attend discussions. Finally, a number of study tours were arranged to the agricultural research centres and model farms. On return the participants wrote essays and prizes were given.

From the reports, it appears that the percentage of groundnut yields has increased from 37 to 178 in the project villages. Results in respect of other crops are being watched. Forthe first time these small farmers in largely dry farming area have had an awakening. Bank representatives come to them and discuss with them credit, agricultural experts discuss with them new techniques. They seem to be moving into another age.

Credit-based area development, which is a major programme of the Government in 67 districts has also been attempted in a few places by non-government organisation. One such is the Vaisali Sangha, a cultural organisation in village Vaisali in north Bihar, which has initiated the formation of a new body,—the Vaisali Area Small Farmers' Association. This village is situated in a fertile region. But 90% of the farmers have holdings less than 1 acre each. Even this one acre is fragmented in small pieces. Most of the land is mortgaged to money-lenders. "Cooperative Society" is a bad name because earlier experience of the cooperative movement in the area has been bitter. The VASFA, as this Association is called in short, began by forming farmers' groups, each for 25 to 50 acres of land, containing farms belonging to different farmers, but adjacent to each other. Each such group is to be served by a common tube-well. 34 small farmers groups have been formed. The entire Association of which the groups are constituents is further divided into Zonal sub associations, each consisting of three or four farmers' groups. This zonal association has a Mechanic and an Agricultural Expert as well as a common godown. Already 14 common tube-wells have been

drilled and 14 hundred acres of land is being irrigated. The liability of each group is joint and most of the work has been organised on the basis of trust. Freedom From Hunger Campaign Society of India advanced the initial funds. It is interesting to note that the loans received by the small farmers are being promptly repaid. This is a very intensive and bold experiment for tackling the problems of the small farmers. It may be too early to come to any conclusions. But it is clear that every stage of the programme has been also a stage of education for farmers, though as yet a systematic educational scheme has not yet been started. Maybe in the process of development some new methods of education may emerge.

The examples given in this chapter are only illustrative. The agricultural landscape in India presents a picture of ferment. Experiments are being conducted in different parts of the country by numerous government and non-government agencies. It does appear, however, from this illustrative survey that there are certain situations that are more favourable than others for farmers' education programme. The old concept of extension education was to provide personnel and facilities for farmers' training and information on a more or less uniform basis throughout a territory and to expect extension and education to bring about a transformation of attitude that would make farmers more receptive to the message of progressive agriculture. It was hoped that in this way farmers would be more inclined to use new machinery, improve the fertiliser input, accept improved breeds of cattle etc. But much of the Indian experience atleast has shown that while there is something to be said for this "softening-the-ground" process, it would be wrong to imagine that farmers' training would by itself bring about a revolution and modernisation. To be effective, systematic farmers' training has to be undertaken in certain situations and in response to certain problems. I would identify these situations as follows in the context of the Indian experience :

(*i*) If agricultural scientists are able to achieve a

technological breakthrough leading to marked increase in the yield and income of farmers, then a training and educational programme would equip farmers for making use of that technology. In such a situation farmers' education would be valid and effective.

(*ii*) In areas where river valley projects have brought under irrigation new lands, farmers would not only be willing but also keen to learn the skills that would enable them to get the maximum output from the newly available water.

(*iii*) Wherever land reforms are honestly and comprehensively carried out and cultivators, who earlier had no land, are able to own their farms, they are under necessity to know methods for getting high production out of their land. That would provide an excellent opportunity for a fruitful training programme.

(*iv*) In compact regions with common problems a development programme which integrates the solution to the various problems into a composite process, would necessitate an educational programme for the farmers. This is because the progress of several items of such development would depend upon the pace of progress in other items. Such synchronization calls for careful training.

(*v*) Wherever land has been newly reclaimed or where owing to a transfer of population people have to be newly settled, there is an excellent opportunity and need for a training programme both in production and in the way of life.

(*vi*) If in a particular area-small or large, an agency concerned with one or more inputs for agriculture wishes to promote the use of that input, then also the conditions would be highly favourable to the introduction of an educational programme. Thus banks promoting their credit in rural areas, manufacturers of tractors and machinery wanting

to have a wider market, manufacturers of fertilizers and pesticides, out to organize extensive sales, all these are agencies that would benefit from a carefully worked out chain of training facilities for the farmers.

The time has come, therefore, for educators to discard the assumption that adult education is a blessing for them to grant ; it is primarily and increasingly a service for them to provide for clearly identified economic goals preferably in compact and manageable areas.

Appendix A

Background Note on Agricultural Information Services in India

"Farm Information Service" was organised initially in 1958 when the Central Farm Information Unit came into being under a separate Directorate of Extension in the Ministry of Food and Agriculture. Simultaneously, such units were established in the States under the Department of Agriculture. Gradually Farm Information Units were opened in 16 States and Union Territories *e.g.* Andhra Pradesh, Assam, Maharashtra, Gujarat, Kerala, Orissa, Mysore, Madras, West Bengal, Tripura, Rajasthan, Bihar, Himachal Pradesh, Madhya Pradesh, Punjab and Uttar Pradesh.

Intensive Agricultural District Project (I. A. D. P.) was launched in 1961-62 in 15 selected districts all over the country. To provide intensive information communication support to the programme on Agricultural Information Unit was attached to each of the 15 project districts. Today there are IADP Information Units at West Godavari (A.P.), Tanjavur (Madras), Bulsar (Gujarat), Allepey (Kerala), Palghat (Kerala), Burdwan (West Bengal), Sambalpur (Orissa), Silchar (Assam), Bhandara (Maharashtra), Shahabad (Bihar), Raipur (M.P.), Ludhiana (Punjab), Aligarh (U.P.), Mandi (H.P.) and Mandya (Mysore). Each of these information units are provided with basic equipment (offset press, camera, tape recorder, slide and filmstrip projector, film projector, etc.).

In addition to the above, some States provided a District Agricultural Information Officer in each of the Intensive Agricultural area districts where the intensity of operations was less than the IADP districts.

Commodity Development Officers have also maintained nucleus information staff for dissemination of information regarding Sugarcane Development, Oilseeds Development, Jute

Development, Coconut Development, Spices Development, etc. Autonomous bodies and public undertakings such as the I.C.A.R. (Indian Council of Agricultural Research), Food Corporation of India, Seeds Corporation, etc., and the All India Research Institutes such as the IARI, IVRI, CRPI etc., have also arrangements for dissemination of research information. Most Agricultural Extension Wings have an information Centre attached to them.

Industries in the private sector such as the Fertilizer Association of India, Pesticides Association, Shriram Khad, Escorts, Shaw Wallace etc., have developed Information Communication Units in their organisations.

The Central Farm Information Unit of the Directorate of Extension under the Ministry of Agriculture is at present responsible for the following activities :

(*a*) Providing information communication support to all the divisions in the Ministy of Agriculture including the Regional Commodity Offices and the National Dairy Research Institute.

(*b*) Planning and producing agricultural information communication material for the field extension workers all over the country.

(*c*) Organising and executing the Livestock and Poultry shows, All India Fruit Shows and Udyan Pandit Competitions, All India Crop Competitions, Milk-yielding Competitions and Stray Cattle Catching Scheme.

(*d*) Giving information communication support, especially in the form of audio-visual aids for teaching the farmers, to the Farmers' Training Programme.

(*e*) Planning, producing and distributing instructional and research films in cooperation with the Ministry of Information and Broadcasting.

(*f*) Training the agricultural information personnel in the principles and methods of information communication.

(*g*) Maintaining a close liaison with the All India Radio, Agricultural Universities, research institutions, Ministries and Departments for better coordination of dissemination of agricultural information.

All the media of information communication such as Radio, Press, Publications, Exhibitions, Visual aids, Films, etc., are employed for effective information communication. Special emphasis is laid on the production and utilisation of audio-visual aids in support of various development programmes. Recourse is taken to both projected and non-projected visuals for effective teaching programme and quite a number of both projected and non-projected visual aids are produced and supplied to the extension institutions, farmers' training centres and agricultural universities. Of the publications brought out on various aspects of agriculture and animal husbandry for the field extension workers, Departments of Agricultural and Animal Husbandry, agricultural institutions, All India Radio and Agricultural Universities mention may be made of leaflets, folders, hand-bills, magazines, bulletins, charts, posters, teaching charts, flannelgraphs, flip books and text-books. A little over 7 million copies of publications containing the technical know-how of raising important cereals, cash crops and other allied subjects are published in popular language both in English and Hindi and distributed every year. Text books that are brought out both in English and Hindi are meant for the training of gram Sevaks and gram Sevikas and for use of students in agricultural schools and colleges. All these publications are regularly mailed to the State Department of Agriculture, State and IADP Information Units, All India Radio Stations, Farmers' Training Centres, Gram Sevak Training Centres, Extension Education Institutes, Agricultural Colleges, all the Block Development Officers all over the country and voluntary organisations free of cost. So that progressive farmers can get the benefit of these publications copies are also made available for sale at a nominal price. For this the mailing section under the Unit maintains a huge list of addresses under different categories.

Based on the results of recent researchers that are of practical value to the farmers, farm news releases in English and Hindi and other four regional languages are sent out twice every week to the newspapers, State Departments of Agriculture, all stations of All India Radio and the agricultural universities. Illustrated features with free supply of blocks on the technical subjects and success stories are also issued regularly to about 400 newspapers circulating in rural areas all over the country and the State Departments of Agriculture, All India Radio stations and the Agricultural Universities.

The Farm Information Unit at the Centre also provides prints of agricultural photographs and blocks free of cost to the newspapers and magazines circulating in rural areas for wider dissemination of agricultural information.

A special feature of the Unit is the production of non-projected visuals containing the pictures of the salient steps involved in raising high yielding crops, controlling pests and diseases etc. with separate talking points. These visuals produced on cloth, rexine and tin sheets by silk screen process have proved to be very useful in the training of farmers at the farmers' training centres and of the agicultural students in the universities as these have provided lot of flexibility for incorporating into local recommendations and local practices.

With the initiation of the scheme on "Farmers' Training" and the organisation of Charcha Mandals with the trained farmers, the Unit has taken up the production of illustrated flip books to be backed by cassetee tape recorders so as to provide the Charcha Mandals with the information on advanced technology. The programme on these lines have been taken up under the farmers' training programme.

The Farm Information Unit takes part in about 100 exhibitions a year in rural and urban areas and in schools. All the exhibitions put up by the Central Farm Information Unit are of instructional type and differ from the publicity type of exhibits. The exhibitions put up by the Farm Information Unit have proved to be a strong visual aid in informing farmers the technical know-how of agricultural department. As exhibits are recognised as strong visuals, the unit has fabricated portable exhibition sets on different aspects of agricultural development and practices. These portable exhibition sets are provided to the farmers' training centres and agricultural universities for both class-room teaching and out-of-class teaching.

Production of short instructional and research films on agriculture in cooperation with the Ministry of Information and Broadcasting has received a special emphasis in the Ministry of Agriculture. During the Fourth Five-Year Plan a scheme has been launched at the cost of Rs 8.4 millions for the production of about 100 films during the plan period. These films are dubbed in all regional languages and when completed are distributed to the State Agricultural Information Units, IADP

Units, Farmers' Training Centres, Gram-Sevak Training Centres and EEIs (Extension Education Institutes) for wide screening in rural areas through agricultural circuit. Research Films are also made available to the agricultural colleges and universities for teaching purposes.

The Central Farm Information Unit also maintains a film library where about 1,600 copies of films and 1,250 slides and film strips are kept. These films, film slides and film strips are loaned to the various agricultural organisations, institutions, universities and individuals who are members of the library. This is a free service and every year about 1,200 films are loaned out to such organisations and individuals.

Being the Central organisation the Farm Information Unit is responsible for providing in-service training in the theories and practices of information communication to the information and extension personnel in the States. It also provides job training for technical persons employed in the States and IADP and information units in the working of the offset press, silk screen printing, preparation of exhibits, photographs, etc. Training in the use and maintenance of audio-visual equipment is also being given to the officers in the farmers' trainining centres, GTCs and ETCs. Such trainings are arranged through regional and district seminars or workshops of both short and long durations.

The Central Farm Information Unit is also organising All India and Regional Livestock and Poultry Shows, All India Milk Yield Competitions, All India Fruit and Vegetable Shows, Udyan Pandit Competitions and All India Crop Competitions.

Central Farm Information Unit maintains close liaison with the States Agricultural Information Units and IADP Information Units and helps these units to chalk out their annual programme and fix priorities on subjects for providing information support. It also maintains a close liaison with the Farm and Home Units of the All India Radio, Ministries and Departments concerned with the information communication, All India Mass Communication Institute, All India Institute of Audio-visual Education, Research institutions, agricultural universities and other bodies concerned with agricultural information communication.

In order to gear up information activities in the States the Central Farm Information Unit has taken up the following schemes :

(*a*) Providing Mobile Exhibition Van to each of the State, and

(*b*) Providing Farm Radio Officer to the State Agricultural Information Units.

In order to take agricultural information to the door-step of the farmers, the Central Unit has provided a mobile exhibition van equipped with portable exhibition sets, samples, specimens, publications and film projection facilities to each of the States. Four States have already availed of this facility and the cases of other States are being taken up on demand. The Government of India has provided Rs. 50,000 as grant for the purchase and construction of such a van.

Farm Radio has been playing a very important role in disseminating agricultural information on a mass scale. With the establishment of more farm and home radio stations it has become imperative to provide a Farm Radio Officer with the State Agricultural Information Units who could collect and prepare materials from the Agricultural Department for broadcast by the Farm and Home Stations. This is necessary in view of the need for continuous feeding of the All India Radio Stations with the technical know-now on aspects that emerge from the experience of agricultural extension field workers and in consideration of the priority to be given on particular items as desired by the subject matter specialists in Agriculture Department.

In order to carry out the above load of information communication activities the Central Farm Information Unit at present has the following divisions :

Divisions of the Central Farm Information Unit

(*i*) Publication Cell

(*ii*) Printing Cell

(*iii*) Blocks, photographs and film library

(*iv*) Audio-visual cell

(*v*) Film Unit

(*vi*) Graphic and art cell

(*vii*) Photographic Cell

(*viii*) Exhibition Cell

(*ix*) Information Training Cell

(*x*) Livestock show cell

(*xi*) Fruit and Vegetable Show cell

(*xii*) Crop Competition Cell

(*xiii*) Mailing and Sales cell

(*xiv*) Stores

(*xv*) Administrative cell.

Farm Information Units as stated earlier were created in the Departments of Agriculture in 16 States and Union Territories. Though the organisational pattern of these Agricultural Information Units varies from State to State but in general each Unit is provided with an Agricultural Information Officer, Press Operator with a Machanic, Binders and Mobile Van Driver-cum-operator. These State Units are placed under the Director of Agriculture and produce and disseminate agricultural information materials on similar lines as the Central Farm Information Unit. Each of the State Units works in close cooperation with the IADP Information Unit wherever existing and the District Public Relations Officer and Field Publicity Officers and Information Officers of the Private Industries in the States concerned. There is a close cooperation between the State Agricultural Information Unit and the All India Radio, Farm and Home Unit in particular in matters of programming and broadcasting agricultural information. Some of the State Information Units have also District Information Officers under them in the IAA and IADP districts. All the materials on information communication are channelled through the field extension staff of the State who in turn convey the information to the farmers. There is also a system of direct mailing of information material to the chosen progressive farmers in the State. The farmers' Training Centres, Gram Sevak Training Centres, Extension Education Institutes, Agricultural Universities and colleges and panchayats are all kept on the free mailing list of the State Agricultural Information Units. In each block one of the Extension Officers is responsible for information communication at the block level.

Organisation in IADP Information Units

There are 15 IADP districts and each is provided with an information unit the organisation of which is as follows :—

Agricultural Information Officer, Radio Officer or Exhibition Officer or Assistant Information Officer, Photographers and an Assistant, an Artist or a Projector Operator, Offset Press Operator, Compositors and Binders. The IADP Information Units work in close collaboration and under the guidance of the State Agricultural Information Units. Servicing facilities that are required for maintenance and running of the press in both IADP and State Agricultural Information Units are provided by the Central Farm Information Unit. The IADP Information Centres are meant specifically for providing intensive information support to the district and also the farmers' training centres that are located either in the district or at centres. These units also supplement the work of the State Agricultural Information Units in cases of urgent communication needs.

CENTRAL FARM INFORMATION UNIT, DIRECTORATE OF EXTENSION, MINISTRY OF AGRICULTURE

PUBLICATION CELL

(*a*) Editorial
(*b*) Press Services.

PRINTING CELL

(*a*) Offset Printing
(*b*) Silk Screen Printing
(*c*) Block Making.

BLOCK PHOTOGRAPHERS AND FILM LIBRARY

Distribution of Blocks & Photographs free of cost.
Loading of films, slides and film strips for screening.

MAILING & SALES CELL

Maintaining list of mailing, distribution, sales, securing Ads, keeping accounts of stock.

AUDIO-VISUAL CELL

(*a*) **Non-projected visuals** as flash cards, flip-books, posters, charts, teaching charts.
(*b*) **Projected visuals** as slides, film strips.

FILM UNIT

In cooperation with M/O & I & B.

GRAPHIC & ART CELL

PHOTOGRAPHIC CELL

INFORMATION TRAINING CELL

SEMINARS & WORKSHOPS

STORES

CROP COMPETITION CELL

All India Crop Competitions Krishi Pandit Awards.

ADMINISTRATIVE CELL

EXHIBITION CELL

LIVESTOCK SHOW CELL

(*a*) All-India & Regional Livestock & Poultry Shows.
(*b*) Milk Yield Competitions.
(*c*) Stray Cattle Catching.

FRUIT & VEGETABLES SHOW CELL

(*a*) All-India Fruit shows.
(*b*) Udyan Pandit Competitions.

Appendix B

Procedure of Conducting National Demonstrations

The Indian Agricultural Research Institute has been entrusted with the responsibility of conducting National Demonstrations in the Union Territory of Delhi. These demonstrations are conducted by a team of scientists of "production unit" of I.A.R.I. consisting of Agronomist, Geneticist, Soil Scientist, Horticulturist, Entonomologist, Plant Pathologist, Agricultural Engineer, Agricultural Economist and Extension Specialist, who cooperate with the Block Extension Personnel and Farmers in this Programme. The Head of the Division of Agricultural Extension, I. A. R. I., is the Coordinator of the Programme. The main steps as followed by I.A.R.I. scientists in the conduct of these demonstrations are as follows :

I. Planning Stage

1. Deciding the number of demonstrations for each major crop. This is done keeping in view the prevailing agro-climate conditions and areas occupied by the major crops in the State by the scientists of the Production Unit in the light of the total number of such demonstrations allotted by I.C.A.R.

2. Planning of the crop-sequence and selection of best varieties for each crop. This is decided in consultation with Agronomy and Genetics divisions of I.A.R.I.

3. Careful selection of the right type of farmers and suitable demonstration sites is made by the specialists of the production unit in cooperation with the Block Development officer and other extension staff. Only those farmers who are cooperative in spirit, willing to try new and improved agricultural practices, respected and liked by other farmers and have farm conditions similar to majority of the farmers in the village, are selected as demonstrating farmers.

The criterion for selecting suitable sites are :

(*i*) Assured irrigation facilities.

(*ii*) Suitability of land for the crop.

(*iii*) Nearness to the village.

(*iv*) Nearness to the approach road ; and

(*v*) Field size not less than one acre.

4. Distribution of demonstrations among scientists for closer supervision and for looking after all the necessary arrangements for individual plots. Each specialist in the production unit has 3 to 4 demonstrations under his direct charge.

5. Making the farmers understand the purpose of demonstration. After the selection of the farmer, the scientist incharge of the demonstration explains to the farmer in detail the purpose and method of conducting the demonstration and what the farmer is expected to do.

6. Informing potential adopters and local village leaders about date, time and place of conducting the demonstration in their village. This is done through the demonstrating farmers, local extension staff individual contact and group discussions.

7. Deciding package of practices for each crop keeping in view the technological and economic considerations. This is done by the scientists of the production unit in consultation with the Divisions concerned.

8. Based on above, working cut the actual input requirements for each demonstration and each crop. Fertilizer requirements of each crop are based on actual soil and water analysis of the plot conducted by the soil scientist which invariably precedes the laying of a demonstration.

9. Arrangement for the supply of inputs from various agencies. The fertilizer input is purchased from cooperative federation and seed is supplied by the Genetics division of I.A.R.I. or purchased from National Seeds Corporation. Arrangement of inputs is ensured in advance and they are transported to site before the actual start of the demonstration.

10. Preparation of a written plan and calendar of activities. The written plan and calendar of activities with month and dates

on which a particular field operation has to be carried out are decided in advance for each demonstration and published.

11. Constituting committees for assessing the yields obtained on the individual plots. In order to ensure the reliability of the results a committee consisting of 3 members of the production unit is constituted, who get the harvesting, threshing and weighing etc., done in the presence of local farmers and extension workers.

II. Execution Stage

1. Laying out the demonstrations. After all the initial preparations as detailed in the planning stage, the actual demonstration is laid out by the scientist incharge of the demonstration with the help of the farmers.

2. Putting of the publicity boards on the demonstration plots in such a manner as to attract the attention of the public. The board is as per design approved by I.C.A.R.

3. Placement of fertilizer quantities based on soil and water test analysis and sowing of selected variety of seed are done under personal supervision of the specialist incharge of the demonstration.

4. Subsequent operations like top dressing of fertilizer, irrigation, plant protection measures and interculture are performed in the presence of specialist and the demonstrating farmer concerned. Other farmers are also invited.

5. Frequent visits are made by specialists to the plots during various stages of crop growth for recording observations on different aspects.

6. Organisation of field days efforts are made to educate farmers regarding techniques of crop production demonstrated in National Demonstrations by organising field days at different stages of crop growth and at the time of final harvesting and threshing. During these field days attempts are made to organise group discussions at the site and answer questions raised by the farmers.

7. Keeping accurate records and information on factors like soil analysis, germination of crop, pests and diseases and such other aspects and reporting in the pocket diaries provided for the purpose by I.C.A.R.

8. A little before harvest an eye estimate of the crop is normally done by the committee constituted for the purpose.

9. Harvesting and threshing of the crop produce is done under the personal supervision of the specialists.

10. Final yield estimate of the plot is obtained by weighing the produce in the presence of a committee including one or two farmers and representatives of extension agency working in the demonstrating village.

11. Residual fertility status of soil is assessed by conducting soil tests for individual demonstration plots after harvest of each crop.

12. Submission of reports and diaries as required by I.C.A.R. by due date.

13. All these steps are followed for all the three crops included in the multiple cropping sequence on demonstration plots.

III. Follow-Up Stage

1. The results of successful demonstrations are publicised through radio, television, press and other audio-visual aids.

2. Efforts are made to persuade the demonstrating farmers as well as the other farmers in the village to put into practice the scientific practices demonstrated and necessary technical help and guidance is provided for the same.

3. It may be emphasised here that the approach in conducting National Demonstrations is an inter-disciplinary one where not only the scientists from various disciplines (production unit) work together but the local Block Development Officer and other extension staff is also actively associated.

Appendix C

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ERRATUM

Page 4, line 27 for widening read narrowing

Page 11, line 22 for same read similar

Page 15, line 2 for What read Which.

Page 23, line 18 for misconceived read illconceived

Page 36, line 13 for Indicative read Perspective

Page 43, line 6 for Bangkok read Asian

Page 44, line 12 for 45 read 46

Page 44, line 15 for 3 to 6 acres read 2.5 to 5 acres.

Page 44, line 17 for 1.75 crores read 1.50 crores.

Page 51, line 11 for seven read five.

Page 107, line 21 the words milk sheds of should be read before four or five.

Page 121, line 6 for labouring read labour.

Page 125, line 21 for roaming read lodging.

Page 128, line 5 for phase read pace.

Page 141, line 34 for Integrated Area Development Projects read Intensive Agricultural District Programme.

Page 146, line 30 for 26 crores read 10 crores.

Page 152, line 22 for 88 districts read 81 projects.

Page 155, line 18 for applied read adaptive

Page 190, line 20 for 350 read 250.

Page 192, line 33 for four read a number of

Page 215, line 20 for districts read projects.

Page 226, line 2 for 15 read 17.